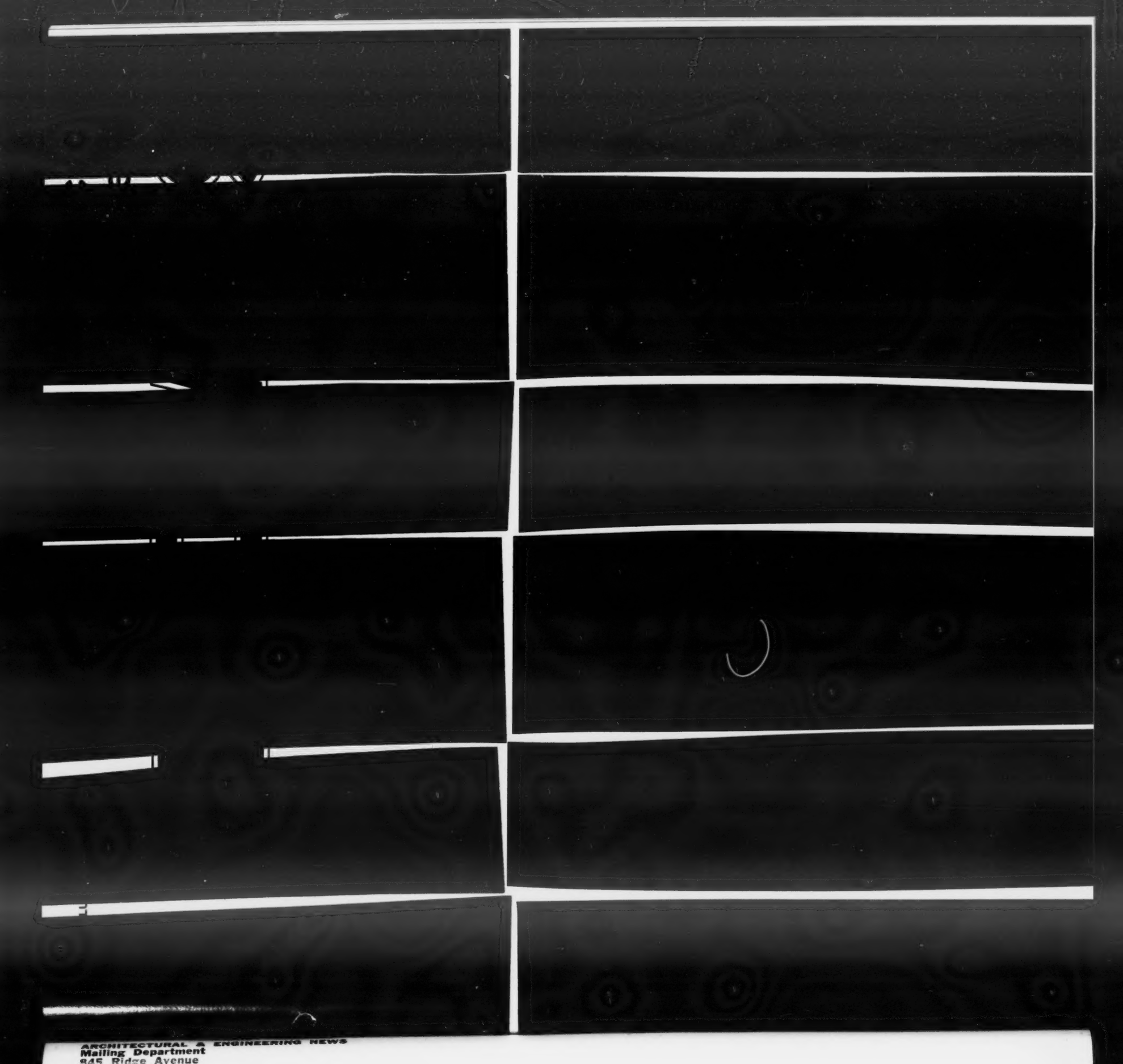

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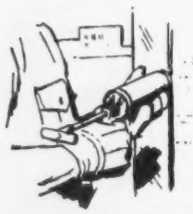

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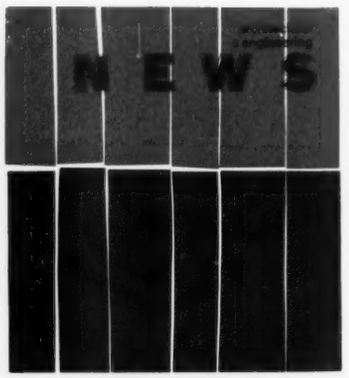

This issue deals with the various phases and problems of curtain wall, sandwich panel and related construction. Tony Palladino has underscored the content with his cover design of fragmented panels—characteristic of contemporary component assembly.

10

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COMMUNICATIONS

A/E NEWS welcomes the opinions of its readers. Letters should be addressed to: Editor, Architectural and Engineering News 452 Fifth Ave., N. Y. 18.

Curtain wall panels

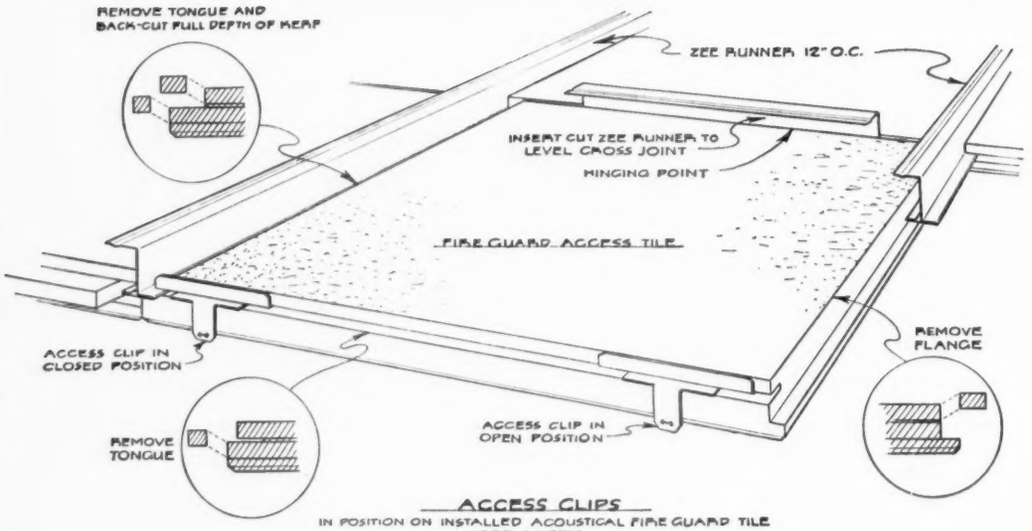
Editor:

. . . I am taking the liberty of writing to you so that I may express my opinions regarding various aspects of the field of curtain walls in the hope that they may be of interest to you . . .

It is my firm opinion that much of the editorial criticism that has been placed upon the whole field of curtain wall systems has been very real and based upon some serious discontents on the part of clients and architects. I feel that much of the problem lies with the fact that most curtain wall systems have been originally inspired by the window wall people, who were metal fabricators and extruders, and were not at all concerned with the panel itself. In fact, most of the window wall people did not choose to make their own panels, and merely subcontracted them out to various porcelainizers of steel pans throughout the country. Indeed, originally the panels used were all of the same color, and we are to the point now where we are adding a bit of additional color, and some small measure of some design character. However, at the present state of the art, we feel that the architect does not now have adequate control or choice of a proper variety of panels which would be truly representative of today's technology. We believe that the architect should be able to control interior and exterior finishes to the same degree that he does when using other materials. He can select types of brick veneer, for instance —color, texture—in cast concrete he can do the same—in wood veneers—in other ceramics. He controls this just as he controls the floor finishes, the ceiling finishes, etc.

[Our approach] is strictly panel oriented. We are concerned only with the panel and not with its suspension system. The architect now has an opportunity to choose almost fifty different erection systems produced throughout the country. We feel he does not have access to a rich and full variety of panels which can be used with the systems. In addition, we feel he has not had a full grasp of additional qualities which can be integrated in curtain wall systems, and that is light-transmitting systems as opposed to optical vision systems. I believe that it can be said today that buildings no longer need to be considered as opaque structures with fenestration. Rather, they may be considered partially translucent with less fenestration since fenestration now need only provide optical areas for vision and not for light.

Since this can now be accomplished without sacrificing advantages of insulation, strength, or


REMOVE TONGUE AND BACK-CUT FULL DEPTH OF MEAT
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FIRE GUARD ACCESS TILE
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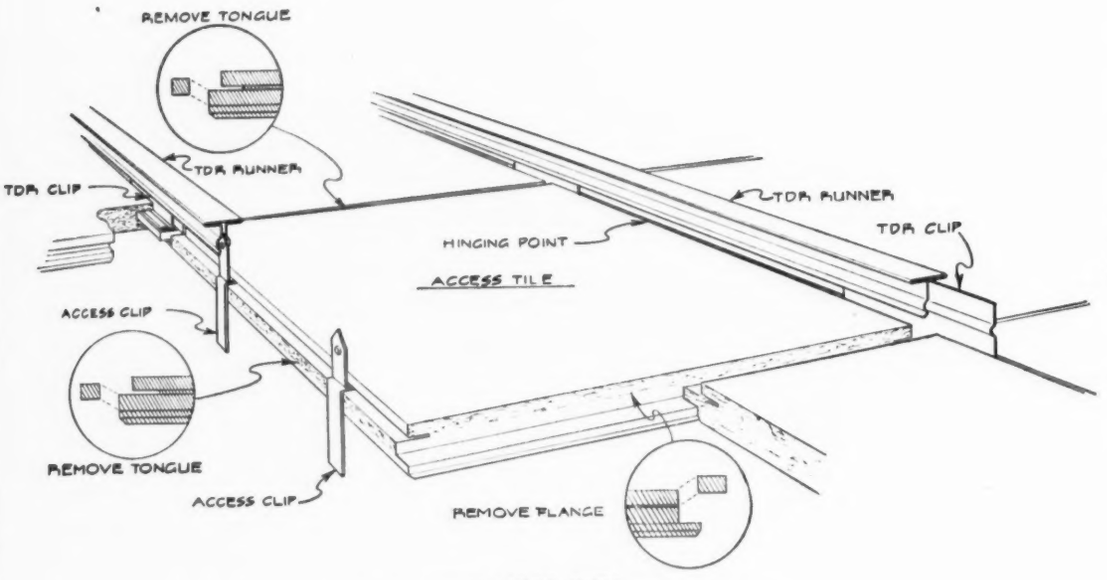
ACCESS CLIP IN CLOSED POSITION
REMOVE TONGUE
ACCESS CLIP IN OPEN POSITION

ACCESS CLIPS
IN POSITION ON INSTALLED ACOUSTICAL FIRE GUARD TILE
ZEE SYSTEM



ACCESS CLIPS
IN POSITION ON INSTALLED ACOUSTICAL FIRE GUARD TILE
TDR SYSTEM

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How Armstrong Acoustical Fire Guard can provide easy accessibility

Acoustical Fire Guard's new access-clip arrangement allows access to any part of the ceiling's plenum chamber

BECAUSE OF the maze of pipes, ducts, and electrical equipment installed above the suspended ceilings of today's buildings, accessibility has become an important consideration in specifications. Emergency entry to the plenum chamber of the traditional fire protective ceiling has meant expensive damage or loss of time.

Armstrong Acoustical Fire Guard—the first time-design-rated acoustical ceiling tile—provides access to any part of the plenum chamber. The access-clip arrangement (see diagrams) permits tiles to be removed with ease and speed. The system works equally well for either 5/8" or 3/4" Acoustical Fire Guard tiles in either the zee or TDR systems—both of which have official fire-retardant ratings from Underwriters' Laboratories, Inc.

This access-clip system is more economical to install than unsightly access doors in conventional ceilings. When in place, the clips are almost invisible.

To learn more about Acoustical Fire Guard and the many benefits it can offer, call your Armstrong acoustical contractor (he's in the Yellow Pages) or your nearest Armstrong District Office. For further technical information about Acoustical Fire Guard, write to Armstrong Cork Company, 4210 Ryman St., Lancaster, Penna.

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COMMUNICATIONS

cost, we believe it merits clear discussion.

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In summary, then, the two major points which I believe would be most interesting to your readers would be these: (1) concepts of modular construction should not completely eliminate a rich opportunity for an architect to select color, form, texture, scale, etc. I believe the whole field of modular building panels of a sandwich nature can provide all of these opportunities very easily, and well within current construction costs . . . A wall panel may be little more than two sheets of tempered hardboard with some paper honeycomb; or it may be a highly articulate thing, translucent and colorful, enriching the dynamics of the area. (2) Materials technology now permits structural modular systems capable of transmitting light without sacrifice of cost, insulation, or strength. Here, too, is a vast, new architectural concept unfolding; and if the architect is given the proper freedom of choice of scale, design, color and cost, developing translucent walls and roofs is now a reality.

George R. Hermach
President,
Architectural Plastics Corp.
Eugene, Oregon

LaBeaume essays

Editor:

I have appreciated and used the various issues of Architectural and Engineering News particularly for the informative and factual presentation of various difficulties in construction as therein described and hence look forward to each issue—learning with each.

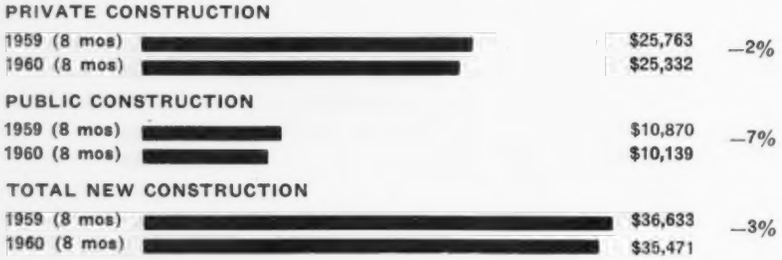
But I write you especially because your editorial on Louis LaBeaume essays on architecture in the current issue: which review is so tantalizing that it has caused me to send post-haste to Vantage Press for a copy of the book. Thank you for informing us all.

I look forward with pleasure to more "Inter-alia."

Yours very truly,
Frederick A. Muhlenberg, FAIA
Reading, Pa.

FORECAST

NEW CONSTRUCTION PUT-IN-PLACE IN THE UNITED STATES INCLUDING ALASKA AND HAWAII FIRST EIGHT MONTHS 1960 COMPARED WITH 1959*



*** COMPARISONS GIVEN IN MILLIONS—CONSTRUCTION ACTIVITY REPORTS OF U.S. DEPARTMENT OF COMMERCE, WASHINGTON, D.C.**

VALUE OF NEW CONSTRUCTION PUT-IN-PLACE, AUGUST 1960*

The value of total new construction put-in-place in August 1960 amounted to $5.2 billion, according to preliminary estimates of the Bureau of the Census, U.S. Department of Commerce. The August 1960 seasonally adjusted annual rate of total new construction was $54.5 billion, 1 per cent less than the equivalent annual rate in July 1960 and 5 per cent below the August 1959 level.

The value of total new construction expenditures in the first eight months of 1960 was $35.5 billion, 3 per cent less than the total for the first eight months of 1959.

Private construction

Total new private construction expenditures in August 1960 amounted to $3.5 billion. This was about the same as in July 1960 but 8 per cent under the level of August 1959. Spending for construction of private residential buildings in August 1960 amounted to $2.0 billion, 1 per cent less than in July 1960 and 16 per cent less than in August 1959.

The August 1960 seasonally adjusted annual rate of total private construction spending was $38.4 billion, nearly 1 per cent less than in July 1960; for total private residential building the annual rate was $21.3 billion, 2 per cent below the July 1960 level.

In the first eight months of 1960 the cumulative value of total private construction expenditures was $25.3 billion compared to $25.8 billion in the same period of 1959. The cumulative value of total private residential expenditures in the first eight months of 1960 was $14.4 billion, 9 per cent less than in the comparable period of 1959.

Public construction

Total public construction expenditures in August 1960 amounted to $1.6 billion, 2 per cent more than in July 1960 and 1 per cent above August 1959. The August 1960 seasonally adjusted annual rate of total private construction was $16.2 billion, a drop of 1 per cent from the annual rate in July 1960.

The cumulative value of public construction in the first eight months of 1960 was $10.1 billion, 7 per cent below the first eight months total in 1959.

Technical note

The estimates in this report continue to reflect the revised, higher level of housing starts, recently introduced by the Census Bureau, and the inclusion of Alaska and Hawaii in the value put-in-place estimates for all categories. The value put-in-place series on the revised basis, which was first released by the Census Bureau with the publication of estimates for July 1960, has been carried back to January 1959. Estimates for periods prior to January 1959 are not entirely comparable to the estimates contained in this report.

Except when special surveys are undertaken, as was done during the 1959 steel strike to obtain some information about the effect of steel shortages on construction work done, these monthly estimates are not based on direct measurements. Primarily, they are derived by applying standard progress patterns (which reflect normal seasonal movements) to the value of contracts awarded prior to the current month. However, in the case of new private dwelling units, patterns are applied to the estimated value of housing starts through the current month. The estimates do not reflect the effects of the varying number of working days in each month, nor of special conditions influencing the volume of activity in any given month, such as unusual weather, overtime, postponements, and except when special surveys are made, materials shortages and work stoppages.

** Based on "Construction Reports," U.S. Department of Commerce, Washington, D. C.*

GAZETTE

J.S. Blossom and P.H. Ziel, received duplicate Diamond Key Awards for their paper entitled "Pressurizing High Temperature Water Systems." Their article appeared in the November, 1959, issue of the American Society of Heating, Refrigerating and Air-Conditioning Engineers *Journal*.

Reassignment of staff responsibilities at the headquarters office of the American Society of Civil Engineers in New York has been announced. Don P. Reynolds, who has served as an Assistant to the Secretary, was named Assistant Secretary, replacing E.L. Chandler, who retired. Mr. Reynolds will continue to administer ASCE's technical activities. E. Stuart Kirkpatrick, who has been an Assistant to the Secretary, was appointed Executive Assistant, a new post in the ASCE administrative staff structure. Donald D. King will continue as Assistant to the Secretary in charge of coordinating the professional activities of the Society. Otis D. Gouty and John Fisk will continue as Assistants to the Secretary, Mr. Gouty in charge of local sections and Mr. Fisk in charge of student chapter activities.

Hugh L. Logan, a physicist with the Corrosion Section of the National Bureau of Standards, has received a U.S. Department of Commerce Silver Medal for Meritorious Service. He was cited for "exceptional achievement in metallurgy, particularly in researches into the stress corrosion cracking of metals and for meritorious authorship."

W.H. Smith, AIA, of Norwalk, Conn., has been named building products development manager for United States Plywood Corp.

Expanding activity in the Orange County area has resulted in the opening of a civil engineering office in Santa Ana. Leonard Gerkin, Chief Planner and Division Manager, has been appointed General Manager of the new facility located at 13912 Ponderosa St., Santa Ana, Calif.

Beda Zwicker has been appointed to head the New York office of Victor Gruen Associates.

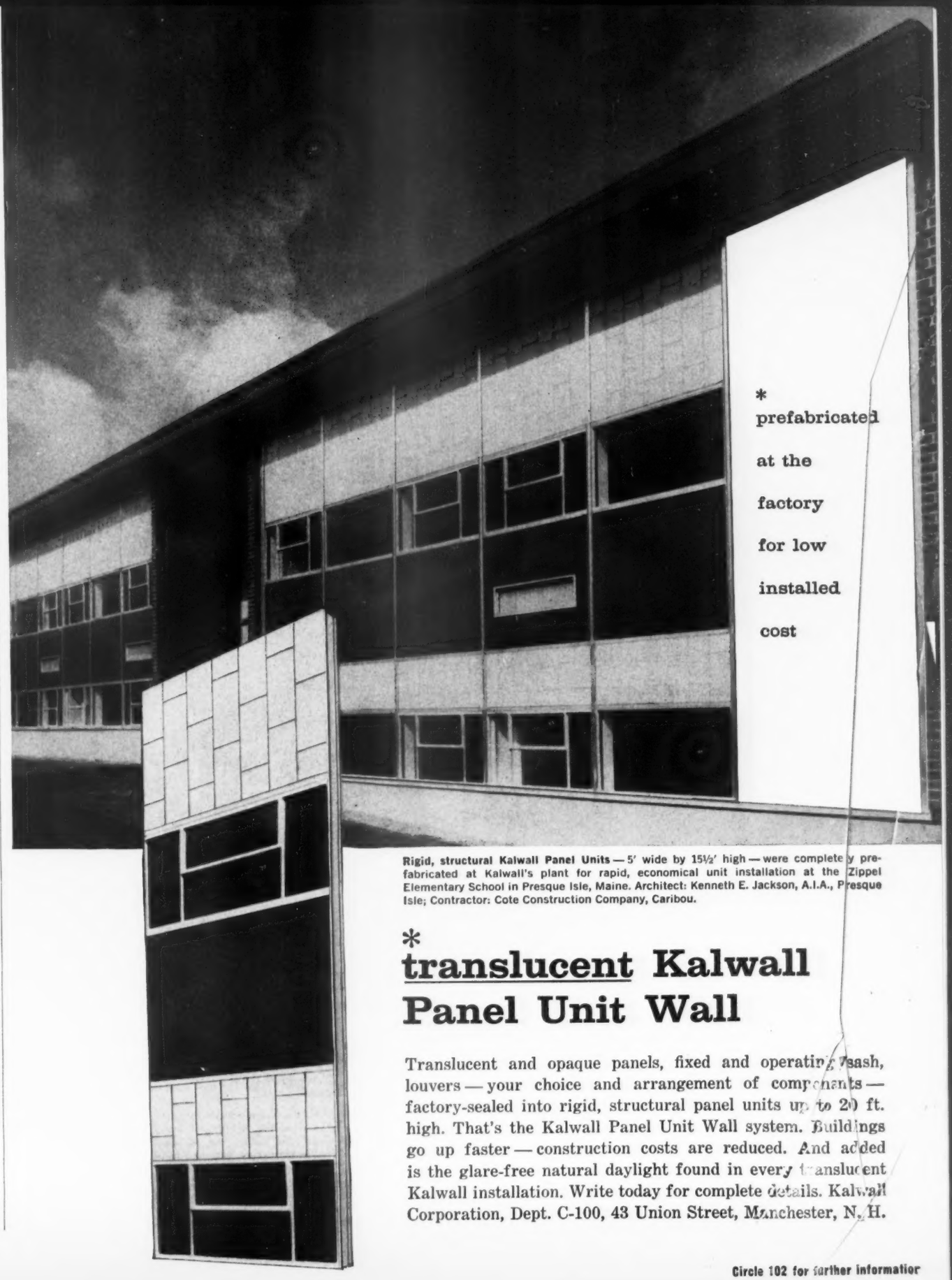
Office announcements

The firm of Soep & Berliner have expanded its service, facilities, and personnel, and is now located in larger quarters at 23 Miner St., Boston 15, Mass.

Sullam & Aehle, Architects, have moved to new offices at 1519 - 14th Ave., Seattle 22, Washington.

Welton Becket and Associates announce the opening of new offices at 10000 Santa Monica Blvd., Los Angeles 25, Calif.

Daniel Chait, R.A., announces the dissolution of the firm of Slater and Chait and the opening of his new offices, Daniel Chait, Associates, at 107 East 31st St., New York 16, N.Y.



Rigid, structural Kalwall Panel Units — 5' wide by 15½' high — were completely prefabricated at Kalwall's plant for rapid, economical unit installation at the Zippel Elementary School in Presque Isle, Maine. Architect: Kenneth E. Jackson, A.I.A., Presque Isle; Contractor: Cote Construction Company, Caribou.

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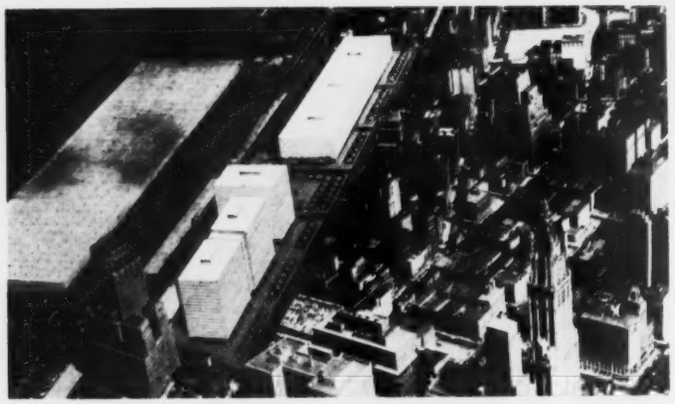
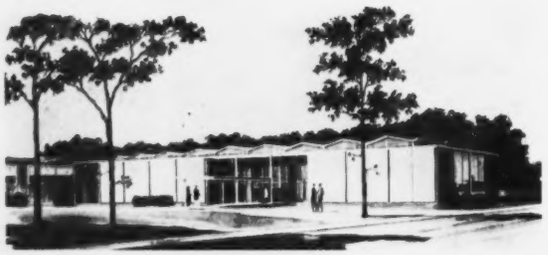
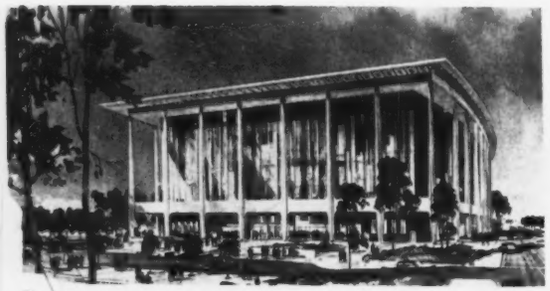


Preliminary plan for $100,000,000 29-acre Washington Market Redevelopment project, superimposed on an aerial view of the downtown west side area of Manhattan, illustrates three, 20-story office buildings containing a total of 3,000,000 square feet of space. Also shown is the 10-story, quarter-mile-long industrial warehouse type structure, to contain 3,250,000 square feet, and the adjacent area under study for pier redevelopment. Consulting architects: Skidmore, Owings and Merrill, New York City.

A|E NEWS



New Valley Stream, N.Y., Public Library will be constructed soon on the Village Green. The $375,000 one-story, brick and glass structure will have approximately 14,000 square feet of floor space with two tiers of book stacks, a seating capacity of 90, lounge area and spacious children's room. The community's present library capacity will be doubled to contain 70,000 books. Architects: Frederic P. Wiedersum Associates, Valley Stream, L.I., N.Y.



Design of the multi-million Los Angeles Music Center has been announced. The five-level Music Center will be erected in LA Civic Center and is scheduled for completion in 1962. Plans include flexible seating to accommodate from 2,700 to 3,100 persons; three-level underground parking for 500 to 700 cars with off-street loading and unloading; a 1,000-capacity hall for receptions and banquets; a 300-seat restaurant; five rehearsal halls and 15,000 square feet of offices. Architects and Engineers: Welton Becket and Associates, Los Angeles.

Loew's Theatres, Inc., has announced its plans for construction of a new $50 million, 50-story hotel to be known as the Americana of New York. It will rise on Seventh Ave. between 52nd and 53rd Sts. Architects: Morris Lapidus, Kornblath, Harle and Liebman; Structural Engineers: Farkas and Barron; Mechanical Engineers: Rutherford Stinard and Associates and Alfred J. Kleinberger, Consulting Engineer.

AIA portfolio

A command performance of the Philadelphia Orchestra, a midnight buffet at the venerable Bellevue-Stratford Hotel, a visit to Winterthur's 100 rooms, vespers in colonial St. Peter's Church, theatre at Playhouse-in-the-Park, cocktails at the Franklin Institute, a private dinner in the "City of Homes"—these might be highlights from a Philadelphian's social calendar for a lifetime.

In fact, they are some of the events AIA members will be able to enjoy all in one wonderful week in Philadelphia next April.

The occasion will be the 1961 Convention of *The American Institute of Architects;* the events highlight a program planned by a Host Chapter Committee that seems determined to set records for foresightedness and good host-manship.

How long the Philadelphia Chapter Committee has been working on plans no one is sure. But, according to Chairman Beryl Price, "We were young men then, and we dreamed the big dreams of youth!" The "we" includes Steering Committee members Paul C. Harbeson, Harry W. Peschel, Charles E. Peterson, and Herbert H. Swinburne.

Delegates to this year's San Francisco convention were surprised and delighted to find the Philadelphians armed not only with notepads, but with reservation blanks for next April's Host Chapter Events. The response has already triggered rumors of a ticket shortage which Price denies —with a word of caution to laggards.

The biggest demand to date is for tickets to the biggest event—a special concert by the world-famous Philadelphia Orchestra with Eugene Ormandy conducting. A particular attraction for architects is the setting—the century-old Academy of Music, newly refurbished without alteration to its legendary acoustics. John F. Harbeson chairs the committee preparing for this event and for the buffet-ball to follow at the Bellevue-Stratford Hotel. Both will take place on Tuesday of the Convention Week.

A new approach marks the opening of Convention Week. Sunday April 23 is set aside as a day for reflection and consecration in the hallowed environs of Independence Hall. Before Monday's busy pace begins, delegates may attend an afternoon worship service at Historic Christ Church, hear vespers

sung by Old St. Peter's Church Boys' Choir, and share buffet supper at Gloria Dei, Philadelphia's oldest (1700) church. A tour between services will encompass Independence National Historical Park and nearby "Society Hill," the Colonial residential area now being redeveloped in the unique Philadelphia manner. A committee headed by Roy F. Larson is responsible for this inspiring preamble to the week's work.

Other events include tours to two fabled duPont showplaces: Longwood Gardens, with its fountain displays, and the Henry F. duPont Winterthur Museum, "Largest and richest assemblage of decorative arts ever brought together." Architects' wives will be favored with a special performance at the city's Playhouse-in-the-Park, a tea for artists in the galleries of the Pennsylvania Academy of Fine Arts, and a junket to the quaint shops of New Hope in Bucks County.

Convention-minded AIA members are reminded that most Host Chapter events are open only to ticket-holders, and that no ticket supply is endless. A postcard to the *Philadelphia Chapter, AIA*, 2400 Architects Building, Philadelphia 3, will bring a complete program with reservation blank.

The *New York Chapter of The American Institute of Architects* recently endorsed the New York City Planning Commission's revised proposal to amend the zoning resolution of New York City and urged that it be enacted into law without further delay.

The AIA Chapter, which represents 900 of the 1,700 registered architects in New York City, gave its endorsement after careful study by its Civic Design Committee.

Frederick J. Woodbridge, FAIA, president of the Chapter, said the group was convinced that the proposed resolution was a long overdue piece of legislation and that it has much greater implications than a technical document affecting the architectural profession. "We must consider it as part of a larger and more comprehensive approach to plan for the furture of our city and the welfare of its citizens," he said.

Some of the features of the proposal which the Chapter commended were the bonuses to builders to encourage plazas and arcades around their buildings, the density controls, and the simplification of parking requirements for retail shopping centers.

(Continued on page 8)

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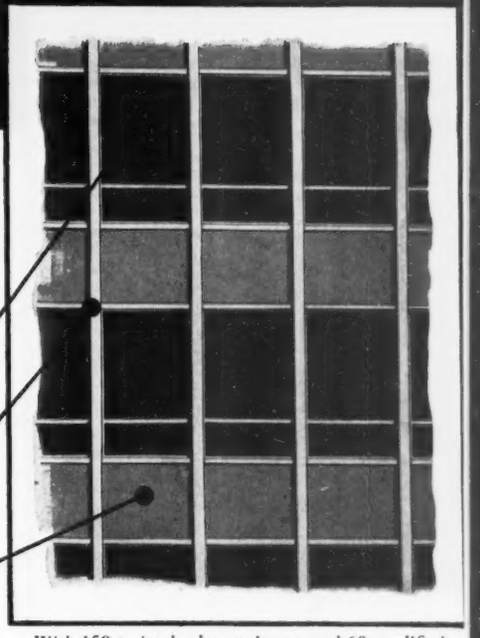

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ADDRESS CITY

An urban renewal plan that would begin the transformation of 35 acres in the heart of Minneapolis has been presented. Pictured is one project in the $42 million Gateway Center Proposal—an array of 1,500 residential apartments named River Towers overlooking the Mississippi River and St. Anthony Falls. The Knutson Co., local real estate and development firm, is sponsoring the project. Architects: Thorsov and Cherny, Inc., Minneapolis.

The first Building Products Register, published by The American Institute of Architects, is now available. It is a single reference work which offers comparative performance criteria for more than 1,300 building products, plus professional digests of 700 pertinent technical standards and specifications. To subscribe, write to AIA, 1735 New York Ave., N.W., Washington, D.C. Cost is $25.00.

Construction is under way on a new three-story, 48,000 square foot building for the Container Corp. of America near Valley Forge, Pa. Entire structure, including the sun shades, are all concrete. The components—beams, columns, and channel sections—were pre-cast in New Jersey and brought to the site where they were assembled. Architect: Herbert Bayer. Consulting Architects and Engineers: Pace Associates and Don Harms, supervising architect.

A|E NEWS

(Continued from page 7)

West coast report

Nearly a thousand architects, their wives, and others concerned with design and construction are expected to attend the 1960 convention of the *California Council* of The American Institute of Architects in Yosemite, October 19-23, it was announced by Wayne S. Hertzka, FAIA, president.

An outstanding group of speakers, including two world-famed architectural figures and five prominent American architects, will participate in the professional program of the convention, Hertzka said.

Each will discuss a different facet of the convention theme, "The Changing Practice of Architecture." The keynote address will be delivered by Marcel Breuer, FAIA, on the subject, "Esthetics in a Changing World." Other featured speakers and panel discussants will be Harwell Hamilton Harris, AIA, A. Quincy Jones, FAIA, Charles Luckman, AIA, Philip Will, Jr., FAIA, Adrian N. Langius, FAIA, and Eduardo Torroja, famed Spanish architect-engineer.

CEC news

A number of important items are on the agenda of the semi-annual meeting of the *Consulting Engineers Council*, which will be held November 10-12 in the Penn-Sheraton Hotel in Pittsburgh.

President Hueston M. Smith of Smith, Hanlon, Zurheide & Levy, Inc., St. Louis, said the Council's executive committee will meet two days prior to the general meeting of directors. Executive committee members include Harold P. King, first vice president, Sherman Oaks, Calif.; Frederick K. Steel, second vice president, Great Falls, Mont.; George J. Toman, secretary, Mandan, North Dakota; Lester L. Bosch, treasurer, Cincinnati; and Ralph M. Wescott, immediate past president, Los Angeles.

The Council is made up of 31 state associations. Each state association has a director and alternate director to CEC. and they will make up the main attendance. President Smith said, however, that the three-day meeting is open to all CEC. members and he urges all members to attend.

The Council's 31 state associate membership probably will be enlarged with the admission of one or more new groups, reports Larry N. Spiller, executive secretary, in outlining the prospective agenda. He said other subjects that probably will come up for discussion are:

1. The recently adopted NCSBEE Model Law Provision Pertaining to Corporate Practice.

2. CEC's Private Enterprise Program, to further private enterprise interests of Consulting Engineers.

3. Republish the CEC. *Manual of Principles and Performance.*

4. Expansion of the CEC. listing of *Member Firms' Engineering Specialties.*

5. Review of the first draft of an expected *Compilation of All Existing Engineer Fee Schedules.*

6. Increased cooperation with the International Federation of Consulting Engineers.

The Pittsburgh committee handling arrangements for the semi-annual meeting is headed by Theodore F. Rockwell of Pittsburgh. He has been president of the Consulting Engineers Society of Greater Pittsburgh and a director of CEC.

The annual meeting of the Council will be held in Chicago next May.

Public service by consulting engineers can be challenging and extremely interesting, as well as a community benefit is the opinion of Ralph J. Abramson, safety committee chairman of the Chicago Association of Consulting Engineers.

He recently was one of the consulting engineers who volunteered their services to a Chicago coroner investigating the death of a prominent Chicago couple.

"A committee of engineering experts ruled Thursday that an open hatch in an attached garage had nothing to do with the seepage of a carbon monoxide gas from an idling Cadillac," a by-lined story in a Chicago daily reported. The article commended the engineering "experts" for their knowledge and service, and explained how their use of a velometer, an instrument for measuring air currents, determined that the fumes could not have drifted from the garage to the house.

Several state consulting engineers' associations now have special committees organized to aid the public in time of emergency. One such is the public disaster committee of the Consulting Engineers Association of Oregon, which helped after the Roseburg, Ore., explosion a year ago and now is recognized by the public as being available in time of need.

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PLATE NO. 686. City National Bank & Trust Co., Columbus, Ohio. Architects: Tully & Hobbs. 5'-0" x 10'-0" panels fabricated by The Marietta Concrete Division, American-Marietta Company, surfaced with special Mosaic Medley Pattern 3015. Installation by Michaels Art Bronze Co.

THE MOSAIC TILE COMPANY CURTAIN WALLS IN CERAMIC TILE A.I.A. FILE NO. 23-A

THE MOSAIC TILE COMPANY CURTAIN WALLS IN CERAMIC TILE A.I.A. FILE NO. 23-A

PLATE NO. 655. Fuhrmann Junior High School, Warren, Mich. Architects: Smith, Tzrapata & McMahon, Inc. Panels fabricated by Mast Mosaics Corporation, surfaced with 1" x 1" unglazed mosaics, colors: Velvetone 104, 184, Velvetex 161.

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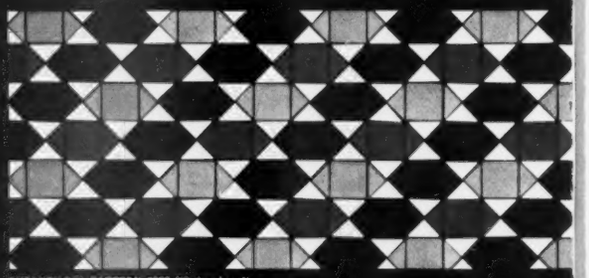

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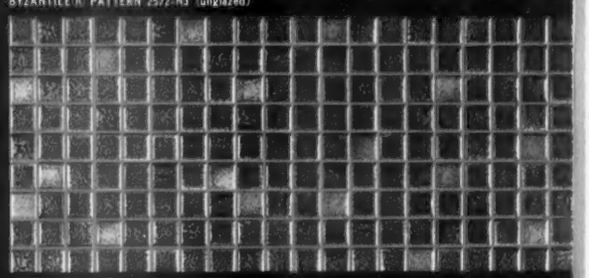

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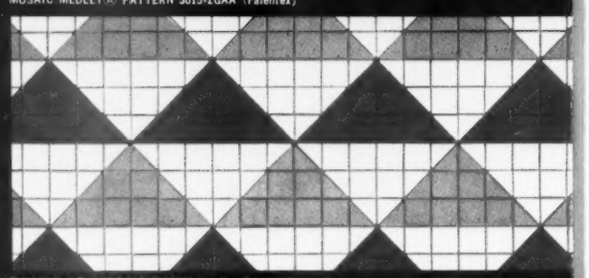

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AMERICA IS ENTERING THE CERAMIC TILE AGE

CASE STUDY Nº1

Connecticut General Life Insurance Building

This paper on the Connecticut General Life Insurance Building was given before the 1959 Fall Conference on Design Potential of Metal Curtain Walls of the Building Research Institute, Washington, D.C. The paper is by Allan Labie of Skidmore, Owings & Merrill, Architects and Engineers, designers of the structure.

For the Connecticut General Life Insurance Building, we endeavored to select the most suitable combination of materials which would serve as the exterior enclosure for this building with reasonable certainty that a durable exterior could be economically maintained in its original condition. During this development, we were fortunate in having the services of Professor Walter Voss of MIT who was engaged by Connecticut General to serve as construction consultant. Since the owner felt it advantageous to select the contractor during the design phase to fill out the team, we were able to add the wide experience of the Turner Construction Co. to the work at hand.

We dedicated ourselves to this task, armed and abetted by the owner's desire to construct a building embodying the most up-to-date technology, as free from maintenance as practicable. This assignment took approximately one year for study and testing, not only for the materials used in its construction, but also to study the interrelated problems such as heating, air-conditioning and sun control.

Selection of materials

Broadly speaking, for the enframement, we seriously considered only aluminum and stainless steel. Other metals and finishes, such as chrome plated bronze and painted steel and aluminum were reviewed in the early stages and not considered further due primarily to high initial costs or problems of maintenance. Our analysis of air-conditioning designs indicated the advantages of using heat absorbing glass. To preserve the beautiful view in all directions, rather large lights of glass were used in the design and because of the 8′ x 11′ size of the typical windows, ⅜″ thickness was needed.

Before offering any recommendations to the owner, Professor Voss set up and directed a test program to corroborate the information we had received from manufacturers of the materials under consideration. The tests would provide for an examination of the weathering characteristics of aluminum, stainless steel, synthetic rubber gasketing and sealants, resistance of heat absorbing glassplate to wind pressure and thermal shock, crazing and delamination of plate glass with ceramic coated backing and the efficiency of cushioning and sealing the large panes of glass to provide relief during deflection and to provide for watertightness.

The tests for weathering characteristics were conducted by the Pittsburgh Plate Glass Co. at its laboratories in Creighton, Pa., under the supervision of Mr. Frank Cox, Director of Research. The tests for the resistance of plate glass to wind pressures and the thermal shock were by both Pittsburgh Plate Glass and Libbey-Owens-Ford. Tests on flexing and watertightness of gasketing and sealants were conducted by Professor Voss in the laboratories of the Massachusetts Institute of Technology.

The materials were subjected to exposure in the Weatherometer and Fadometer, freezing and thawing water immersion, salt sprays and ultra-violet.

Although these tests were made during a rather limited time and the evaluation of accelerated tests is difficult, the tests, in combination with existing data from other sources, justified in our minds that if the exterior skin fabricated and built in the manner detailed on the drawings and with the materials specified for use, metal and glass exterior would be durable, weathertight and readily maintained. I might add that the considered opinion of Professor Voss is that this skin wall will have a life of 60 to

(Continued on page 12)

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CONNECTICUT GENERAL

(Continued from page 11)

75 years without showing any excessive pitting or other corrosive effects. This expected longevity is favored by the rural location.

With complete data to substantiate our selection of materials, the final design was presented to the owner and received approval. Prior to going ahead with the work, the General Bronze Corp., subcontractors for the wall, erected a full size section at the plant and ran a most rigorous dynamic test, exposing the sample panel to 120 mile/hour winds and heavy rain. The section deflected as much as 2" but developed no leaks or cracks. This is the finished product that we recommended. In the construction of the metal enframement we used sheet aluminum designated as Type 3003-H14 for the facing of spandrel beams and columns. Supporting frame members for the fixed glass windows and spandrels of 6063-T5 extruded aluminum covered with polished Type 302 stainless steel moldings surrounding finished trim.

In considering the facing materials, sheet aluminum rather than stainless steel was decided upon as the most satisfactory and economical solution. It was most important to us to achieve a uniformly flat flush surface free from oil canning or disturbing reflections. In 1955, when these materials were being considered, finishing techniques for stainless steel were somewhat limited, and it was virtually impossible to produce a non-reflective finish on wide stainless steel surfaces. However, we were able to satisfy our wants by using ¼" thick sheet aluminum for the wide fascia as seen directly above the ground floor level and by using 3/16" thick sheet aluminum for the remaining columns and beam facings. The surfaces were caustic etched to remove roll marks and then anodized for one hour. Fortunately, Alcoa was able to furnish for this use an anoclad aluminum sheet which had just become commercially available at the time. The clad sheet offered better uniformity than the aluminum previously suggested.

For the supporting frame members, an economical and efficient design was achieved using extruded aluminum. The complex cross sectional shape is achieved by basically one mill operation. The selection of extruded aluminum for these frames as well as for the removable glass stops was an obvious choice. These frame members were shop welded to produce one 11′ wide by 14′ high assembly directly fastened to the steel structural framing.

The frames for the fixed windows and spandrels have stainless steel cover molds. For contrast with the dull finished aluminum fascias, we wanted the gleam of polished stainless steel. Aluminum cover molds were also considered but even with the A-1 polished finish, the aluminum didn't produce the contrast achieved with the stainless steel.

These trim members of Type 302 stainless steel added the touch of elegance often lacking in curtain wall design. The ground floor frames between the marble covered columns as well as the window panels of the dining room and the director's level penthouse were of stainless steel clad construction. The glass we recommended for windows, ⅜" thick heat absorbing polished Solex, had never before been mass-produced. About 600 lights, each weighing 500 pounds, were required for the job. In addition to absorbing about 50 per cent of the sun's heat, they reduce glare 50 per cent; also a necessity in a building having this much glass. Above and below the windows, the spandrel sections were glazed with ⅜" thick tempered glass, ceramic coated on the back. The original intent was to use ¼" thick spandrel glass, but the thinner glass, in the sizes needed, had warped somewhat during the tempering stage.

This ceramic coating on the back, especially in the almost black color we had chosen, acted as a mirror and the only solution to minimize the distortion was to heavy up the thickness to ⅜". To achieve a watertight wall, the entire construction was cushioned in neoprene gaskets and sealed with Thiokol. This detail was applied to every field joint, metal fascias-to-frame, glass-to-frame, and frame-to-flashings. The entire wall was free to expand and contract and deflect with the forces of nature, always remaining sealed.

Problems in fabrication and erection

Initially, we were faced with the problem of achieving for the client his desire for a virtually maintenance free enclosure. With the durability expected, the upkeep was to be limited to periodic washing of the metal and glass, occasional repairs to sealants and possible replacement of damaged glass. In order to do this, means had to be provided to reach all exterior wall areas, including the four inner courts and the connecting passage.

Since the building was not situated on flat terrain and the perimeter was interrupted by covered walkways and ramps, the solution to the glass washing problem was to use a roof mounted machine which would travel horizontally around the building on roof tracks completely free of the walls and stabilized against sway by use of a system of interlocking telescoping frames to form a rigid guide for a platform, free to raise and lower vertically. From this platform, two men can safely do the cleaning.

Fabrication of the component parts, to my recollection, posed no special problems which could be attributed to this design. I mentioned earlier that we did have problems in trying to maintain uniform color of the aluminum facing. Our field representative did not endear himself to the curtain wall contractor when he advised juggling the aluminum panels to minimize the mismatching. However, it did improve the appearance markedly. Prior to the start of the erection, the lines and grades crew were baffled by the seeming impossibility of establishing working base lines and column centers. It was found that the building frame had a tendency to follow the sun, expanding and contracting as the sun moved over. By mutual agreement, everyone agreed to use the lines established at high noon. Once underway, the metal enframement proceeded quickly, each frame being fastened to clips welded directly to the structural steel. A girt channel at the window sill to carry the load of the glass and wind forces was installed by the curtain wall contractor to maintain accuracy.

Locally, the code permitted the steel to be non-fireproofed and this, too simplified erection. Being able to leave the steel exposed allowed the enframement to be clipped directly to the steel members, and we did not have to cope with concrete or masonry usually out of proper alignment.

Foamglass back-up for the spandrels was field assembled on the site and installed in one piece 2-½′ by 5-½′ between frames. To solve the prodigious problem of installing this vast expanse of glass, the Pittsburgh Plate Glass Co. devised a special machine to do the job. For years, glass manufacturing plants had been using the suction cup principle to hold sheets of glass moving from one process to another. In this system, the glass is usually handled in a horizontal position. On the site, however, the glass had to be handled vertically, raised high in the air and held steady until the installation was complete. The specially designed rig was run on rails set along the building, enabling the crew to move this device sideways along the length of the structure.

At ground level, the cases of glass were leaned against the building. The suction cup machine was then swung against the glass and the vacuum pump started. A visual inspection made certain that all eight cups, each capable of lifting 500 pounds, had made proper contact. An electric winch hoisted the glass to the required level and a small hand crank allowed workmen to inch the glass exactly into position. The machine enabled an eight-man crew to set about ten sections a day. This was the first use of suction apparatus to move glass on the exterior of a building under construction. The Thiokol sealant used posed special problems. The material had to be mixed on the site under controlled conditions, applied to the joints that were free of dirt and moisture and carefully ground into the joint. To insure a good job, an independent testing agency inspector, hired by the owner, was assigned to inspect every inch of the sealed joints. The ⅜" thickness of glass simplified this since it allowed pretty good vision down into the rabbet. For neatness, we specified masking along all joints to be sealed. The problem of protection of the metal during erection was not particularly serious since the concrete work was practically completed prior to the starting of the erection.

Performance experience

The building has been occupied since the summer of 1957 and the curtain wall was completed about one-half year before. This provides us with three years on which to base performance experience. I visited the job recently, mostly to get my own impression of how the wall is behaving. I found not a single sign of deterioration of any of the curtain wall components. The owner is pleased with the ease of maintenance and absence of repair work. The entire building seems as handsome and fresh as it did two years ago.

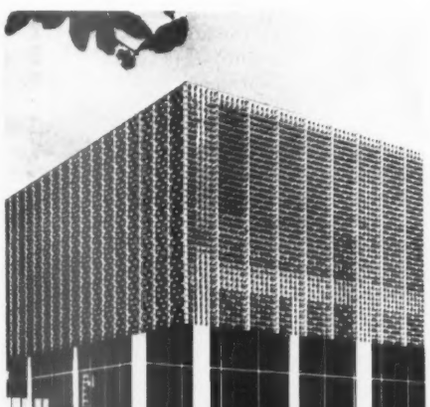
Nothing has occurred to the work that would indicate any modification were we to duplicate the work today. The materials used appear to have been well suited to do a beautiful job and the building is testimony to careful approach to design and selection of components.

Control during fabrication and erection

Insofar as the particular project is concerned, we are talking about a custom curtain wall specifically engineered for a given building, designed and detailed by a clearly defined set of working drawings and specifications. The fabricators who were to bid on the work were carefully screened by the owner's consultant, the contractor and our office to insure that only the most qualified would be allowed to do the work. Nothing was left to chance; the shop drawings were scanned in great detail, samples of actual materials down to the type of screws used had to be submitted for approval. The dynamic weather test included in the specifications as part of the work to be completed prior to starting shop work. SOM maintains a high standard of field supervision to further provide for the desired control. Coupled with a contractor who is just as anxious to do the best job possible, the outcome was not hard to predict.

CASE STUDY №2

New Orleans Public Library



This paper on the New Orleans Public Library in Louisiana was given before the 1959 Fall Conference on Design Potential of Metal Curtain Walls of the Building Research Institute at Washington, D.C. The report was presented by Sidney J. Foise, Jr., of the firm of Curtis & Davis and Associated Architects and Engineers of New Orleans, La.

Design concepts

The curtain wall design for the New Orleans Public Library was generated by a single concept in the program of requirements furnished to the architects by the librarian. That concept was—*that the building should be a department store for books, whose showcases would be the walls of the building, with the interior of the library as the constantly changing display.* This was an enlightened statement with strong foundations to support it. The building is located within one square of the Canal St. shopping district which is the heart of retail merchandising in New Orleans. For the library to be successful in merchandising its "wares" and services, it would have to display them as forcefully as the nearby shops and department stores. Secondly, the building is located at the intersection of two major thoroughfares—Loyola Ave., a new north-south boulevard created as an artery into the new Civic Center, and Tulane Ave., the principal east-west thoroughfare into the heart of the business district. With traffic moving at speeds of 25 to 35 miles per hour, anything less in the way of showcases than all glass walls would have lost its selling impact by not remaining long enough within visual range.

It is important to establish here, at the outset, the importance of this particular program requirement. Without it, the design we are discussing would probably not exist. It is almost certain, in deference to the external forces acting on the design of this building, that the firm would not have had the courage to design a library with all glass walls. These forces are, of course, the distraction of the boundary traffic, climate considerations in connection with air-conditioning, and the problem of glare control from sunlight.

Design problems

Faced with an all glass building, the problem of design resolved into one of finding a solar control device which would satisfy the following conditions:

(1) Protect the glass walls from direct solar radiation during the summer months to reduce air-conditioning load.

(2) If possible, be an effective barrier against penetration of the sun at all seasons, obviating the need for interior control devices such as venetian blinds and drapes. To accomplish this, the solar device would have to be effective from 9:30 a.m. until sunset on three different orientations, at all seasons of the year.

(3) Provide diffused light without glare.

(4) Allow sufficient visibility to retain the openness characterized by the design concept.

(5) Be an aesthetic solution to the facade design.

Research into available systems of solar control soon revealed that the desired function, plus the proper aesthetic effect, could only be achieved in a custom designed product. Drawing on a local heritage of ornamental iron screens, it was conceived that a similar treatment in depth could be designed in the modern idiom, not only controlling the sun but providing the desired aesthetic.

It was evident that the varied factors controlling the design would require many changes and adjustments during the design stage, and the use of the graphical method of projecting the sun's rays would be laborious and arduous. To assist in the design, a Heliodon (a device to measure the shadows cast by a body for a given location and time) was constructed.

Since the solar screen was to comprise the major portion of the facade, scale and visibility were the first considerations in fixing the aperture size and depth. For testing purposes, one-half full size wood models were constructed for testing on the Heliodon device. It was decided from the outset that an attempt would be made to satisfy conditions one and two of the design criteria which had been established.

After several tests, a regular egg-crate of 8" squares by 6"depth was selected. The egg-crate offered simplicity of fabrication and inherent strength. This unit was tested to determine the amount of sun penetration and it was found that the verticals were effective for all conditions, but the spacing of horizontals was too great. To correct this condition, and to provide a secondary rhythm in the screen, an overlay was designed to be mounted on the outer face of the egg-crate which, in effect, was simply two small horizontal louver blades crossing each of the 8" x 8" apertures near the top of the opening, resulting in a reduced spacing of the horizontals. To relieve the mechanical appearance of the system, the horizontal blades of the overlay were interrupted and several of them connected together vertically to form an irregular tracery over the surface of the egg-crate. Where the horizontals were interrupted, the penetrations of sun were trapped by small horizontal fins notched into the rear of the egg-crate. All of the sizes, spacing and depths of members were determined using the Heliodon, which allowed all dimensions to be established accurately, with only small tolerances for safety factor. The accuracy of these determinations naturally meant lower costs in pounds of metal. At this point, all of the desired conditions had been met except to determine if light reflecting from the surface of the screen would be sufficiently diffused to provide uniform, glare-free daylighting.

It should be pointed out that on the west elevation, in the mid-winter season when the sun altitude is low, the solar screen is not effective in preventing sun penetration. To avoid the use of drapes on this elevation of the building, a special plate glass was specified, permitting 12 to 15 per cent light transmission, which was sufficient to effectively control this condition.

On the remaining elevations, it was discovered, by experiment under sunlight conditions, that any color except a dull charcoal gray would cause reflections and produce hot spots with undesirable brightness contrasts. This was something of a disappointment, since the screen had been conceived in two colors, one for the egg-crate and one for the overlay. In the final analysis, this was achieved by making the screen of aluminum, anodizing the egg-crate charcoal gray and the overlay in natural aluminum finish.

To reduce reflections from the satin aluminum finish of the overlay, and from adjacent buildings as well, to tolerable levels, glare-reducing plate glass was used. This glass, also being heat absorbing, assisted the air-conditioning design from the standpoint of diffused solar radiation which might penetrate the screen.

Materials

The total wall of the library consists of large fixed glass plates in a standard alumilited aluminum, puttyless, glazing bar system, with an aluminum solar screen suspended approximately 4' in front of the glass wall. The 4' module was used in plan layout and this determined the location of the solar device 4' beyond the centerline of columns occurring in the exterior glass wall.

Reasons for selecting the glass wall have been covered above. The glazing system is a Pittsburgh

(Continued on page 14)

NEW ORLEANS PUBLIC LIBRARY

(Continued from page 13)

Plate Glass Co. design, puttyless except for the junction with concrete columns, where Thiokol was used as a sealant. Our office has adopted, as a standard, a five-year guarantee against leaks and other defects in factory designed systems. The guarantee was furnished for this system. The reasons for selecting aluminum, both for the glazing members and the solar screen was the desire to use only one exposed nonferrous metal throughout the entire project. Aluminum was selected because of the large variety of standard architectural products available in this metal in controlled, matching finishes, from a large number of manufacturers. In the case of the solar screen, the advantages of aluminum's light weight, color possibilities, structural strength and ease of fabrication all served to reinforce this selection.

Structural design

There were two problems of structural design involved in the solar screen. One, the screen proper and two, the structural system to support the screen 4′ in front of the glass wall.

The solution to the problem of support of the screen was found by searching for a structural unit which would act in two directions equally well; resisting the vertical static loads and, simultaneously, the horizontal and vertical forces of wind loads. These conditions suggested a triangulated space frame which was found to be feasible and was utilized in the final design. Aluminum was used in the space frames because of its permanence, and because the space frames were an integral part of the design, being visible through the screen. Because of this visibility, the open web construction of these frames was also desirable from an aesthetic viewpoint.

The frames were designed to span from column-to-column, a distance of 28′ on the front elevations and 22′ on the side elevations. They are supported by cantilever aluminum brackets bolted to the columns, to which the frames are anchored at one end, and bolted with slotted holes at the opposite end to provide for expansion and contraction. The lower space frame (second floor level) was also utilized as a catwalk for washing the fixed plate glass wall. An aluminum grating was placed on the top horizontal surface.

The design of these units posed no particular problem, except the familiarization of structural designers with the properties of the structural alloys, and their modified characteristics after welding. This was quickly solved by utilizing the consulting services of the Aluminum Co. of America.

The solar screen was somewhat more difficult to analyze, and the problems more varied. We were faced with determining member thicknesses; the size of the unit to be fabricated; providing for expansion and contraction; designing splice connections; finishing of the screen and erection methods. At this point in the development of the design, we called on the services and advice of Metal Trims, Inc., of Jackson, Miss., who was the nearest fabricator in our region capable of handling such a project.

Sizing of a basic unit for fabrication was the first step, and this was limited by the size of anodizing tanks available. It was determined that tanks were available 4′ wide, 5′ deep and 24′ long. It was desirable to minimize field splices so the largest possible unit was selected, 4′ wide (building module) by 13′ long (half of the height of the solar screen). The weight of this unit was approximated at 250 pounds, which could be easily raised by an electric hoist, so this size was accepted.

Engineering of the egg-crate structure was the next step. The obvious economical method of half notching the verticals and horizontals was selected, with welding employed at the junction of the two notches along the center plane of the egg-crate.

The thickness of the egg-crate members was a function of the 4′ span and was determined to be 3/16″ thick. Because each member was notched half its depth, 3″ was assumed to be the depth of the spanning members. As a measure of added safety, the horizontal bearing bars were notched toward the front of the screen, so that when deflected under wind pressure the notches would close and tighten against the verticals passing through the notches. The vertical members banding the side of each 4′ wide unit were slotted and the horizontals were dovetailed into these slots and welded continuously.

Since there was only one horizontal splice in the 26′ height of the screen, there were no structural problems, the vertical bars being considered as nonload bearing. Splices were ship-lapped and bolted within an 8″ aperture so that the appearance of vertical continuity was achieved. The size of the bolts was governed by expansion and contraction forces acting on the two plates in shear.

Each 4′ unit of width of screen was joined to the adjacent one by structural aluminum channels welded to the rear of the unit at each edge. When two units were placed adjacent, the two channels became an H-section, and the channels were bolted together so that they would act in unison. It should be emphasized that the 6″ deep solar screen units in the plane in front of the channels were not joined—only the channels at the rear. This was the method utilized to compensate for expansion and contraction. One quarter of an inch was maintained between the webs of the back-to-back channels, providing the same space between the screen units. The distance from the outer surface of the screen to the centerline of the bolts in the channels is sufficient so that temperature displacement at the heated outer surface occurs in an action similar to the operation of tongs. Expansion in the 26′ height of the screen was not considered sufficient to warrant special consideration.

The final problem to be solved was finishing. Our desire to have two colors at first presented a complication in the fabrication, since the two elements (the screen and the overlay) would have to be anodized separately and then fastened together. However, Alcoa solved this problem by making available for use in the egg-crate a high silicone alloy which was just ready to be marketed, that when anodized, turned dark charcoal gray as a metallurgical reaction (rather than by dye process necessary for other colors). The use of these two alloys allowed the entire unit to be fabricated and assembled, and then anodized in a single operation producing the two desired colors.

At this point in the design, all of the problems involving architectural and engineering analysis had been solved. It is important to stress that all of the problems were solved in advance, in cooperation with the aluminum industry and, as a result, there were no modifications necessary when the contract was let.

Fabrication

The shop fabrication process had to overcome two principal problems. First, welding procedures to avoid prolonged heat which not only changes the characteristics of the alloy, but produces "bloom" in the anodizing process. Second, an assembly and welding jig which would allow the welder to conveniently reach all areas, and to maintain the screen without distortion.

For the first problem, the manufacturer utilized the services of Alcoa Research Laboratory, who advised the purchase of a filler arc welding machine which introduced the weld metal through the nozzle of a welding gun. This method of welding, while performed at the same temperature as heli-arc welding, produces less heat and change in the base metal because it is faster and deposits less metal without excessive puddling. This method also allowed the interior recesses of the egg-crate to be welded faster and more conveniently. It should be pointed out that the welds anodized a darker color than the base metal, but from a distance, the welds are not distinguishable because of the dark charcoal gray color selected. This is a problem to be contended with in welding where other colors are desired.

The jig problem was solved by constructing a table with 32 perimeter clamps and mounting this table on a quadrant, so that it could be tilted to any desired position between horizontal and vertical.

The individual members were purchased sheared to size, and slotted and notched with dies on a punch press. The egg-crate was then assembled, placed in the jig, clamped and welded. The overlay members were pre-assembled, and then welded to the egg-crate outer surface as a final operation.

The next step in the fabrication process was the de-greasing and cleaning, and then to the anodizing tank for a one hour treatment resulting in an 8 mil coating. The color range was held to a 3 point variation, although a 7 point variation is considered acceptable.

It is of interest that the recommended protective lacquer coating was omitted. This was done because of the sheen imparted to the surface causing reflections from sunlight. Shipment of the units was by factory trucks which avoided the cost of crating if shipment had been by public carrier.

Erection

There were 276 units to be erected and they were installed at the rate of two units (or one full height panel) each 30 minutes. The crew consisted of four men—one on the electric hoist, one on the ground and two men positioning and bolting. The final weight of each unit was 233 pounds.

The units were installed with practically no creep, although fabrication of the corner units had been withheld as a precaution until completion, so that field dimensions could be taken and adjustments made in the corner panels.

Performance and appraisal

The total wall construction has performed in excess of expectations. The building has been occupied since November 1959, and has experienced seasonal differences in weather, and expansion and contraction. The minimum winter air temperature was 29° while the maximum summer temperature was 95°, or a range of 66°. The maximum rainfall intensity which the wall has been subjected to was 1.75 inches per hour, while we have experienced a total for the past year of 73 inches (10 inches above normal average).

With these exposures, there have been no leaks in the curtain wall, which is unusual for our high intensity rainfall area. The advantage of this screen as an effective weather break cannot be ignored.

Aesthetically, there has been some comment regarding the color of the screen. While the screen is

dull in color, we are not dissatisfied with the total results of the building. The unscreened first floor glass wall reveals bright primary colors used as decorating accents, which read very definitely in contrast to the screen and provide a balance. The play of light and shade on the screen adds daytime interest, while at night the entire building comes alive as the high intensity illumination reveals the total interior aspect of color and movement.

Our greatest concern prior to construction was the psychological effect of such a large mass of screen on the occupants, since the planning is predominately open; and the restriction of view because of the cutoff effect of the egg-crate. These concerns proved unnecessary. From a stationary point 20′ away from the screen (assuming a 60° cone of vision), you are able to intercept visually approximately 23′ of width, and at the extremes of this intercept you still retain 60 per cent of the aperture opening, since the angle of total cutoff is approximately 37°, requiring a 106° cone of vision. With such openness, the screen is not over-powering or dominant. In fact, we have discovered through personal evaluation, that in viewing an object beyond the screen the eye focuses to the plane of the object, and the screen in the foreground is minimized by being out of focus.

In appraising the wall, we should give consideration to the cost of the screen. Without presuming the glass wall as a basic requirement, the economic justification of the solar screen is not possible. However, in comparing the present design to an all glass building with drapes, the savings in air-conditioning refrigeration equipment is 45 tons, and more than twice that amount in air handling equipment. Further, the control system serving the curtain wall of the building was considerably simplified in that no zoning was required for exterior walls. The air-conditioning engineers were so impressed with the effectiveness of the screen (a full size model was built) that sun load on the protected areas of glass was totally neglected. The total of these savings was estimated to be $65,200. Add to this the cost of drapes which were saved by the screen, and the savings are increased to $79,700. Finally, the savings in operating cost and maintenance annually is $2,200, which, over a 30-year projected life of the air-conditioning system is $66,000.

The solar screen cost was approximately $160,000, which is about 9 per cent more than the estimated saving. Considering the aesthetic value of the screen, we feel it to have been economically justified.

In reviewing the design, the only modifications which we would make in the light of experience would be to develop a splice detail having a better appearance: and to stiffen the overlay members. Because of the ⅛" thickness of these members, they deformed when welded to the egg-crate. The warping is sufficiently pronounced to be observed, although it has not affected the sun control function.

The architectural design intent of the wall construction was clearly defined under "design problems." In our judgment, we had extraordinary success in maintaining architectural intent during fabrication and erection. This is primarily due to early coordination with industry and the utilization of the knowledge and service it had to offer. Perhaps, because of early familiarization with the limitations of fabrication and erection, we tempered our design thinking. However, this does not seem impractical when you consider that results can be achieved without last minute modification or design compromise.

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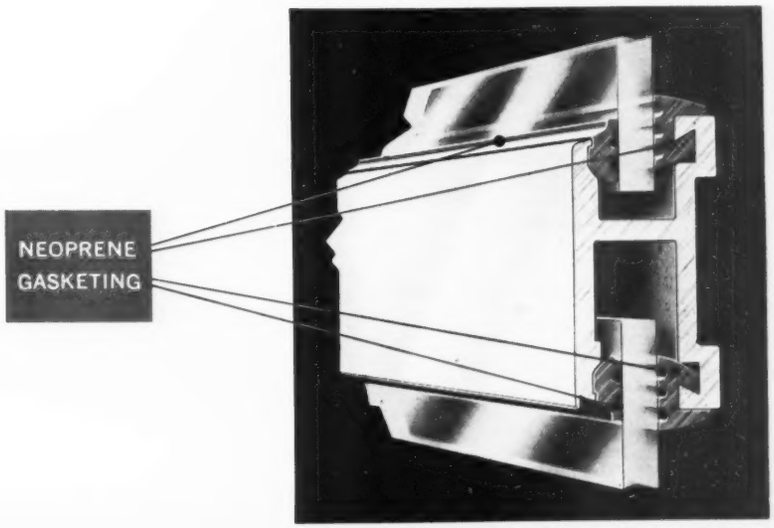

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CASE STUDY №3

Sheraton Hotel—Philadelphia

Philadelphia's Sheraton Hotel was also the subject of a paper given before the 1959 Fall Conference on Design Potential of Metal Curtain Walls of the Building Research Institute at Washington, D.C. The presentation was by Robert C. Dean, AIA, of the architectural firm of Perry, Shaw, Hepburn and Dean of Boston, Massachusetts.

As we conceive the curtain wall, it is the natural product of the frame building. Once a wall is no longer weight-bearing, one of its traditional functions has disappeared. The remaining functions; i.e. the ability to resist wind, earthquake, explosion, to preserve desirable temperatures and to give security and privacy, can be met in other ways than by heavy masonry. Much has been written on the reduction of weight and the saving of area by the use of a curtain wall, but it has been our experience that neither of these reasons is compelling. What has affected us most has been the philosophical or aesthetic aspect of the enclosure. We have been searching for a means of saying that this building has a frame, that it no longer is carried by its walls, that it is hollow and has a skeleton. One method of doing this is to cut away the base and expose the frame there. This somewhat explains the popularity of LeCorbusier's *pilotis*, which demonstrates this principle. We have attempted to emphasize the frame in many other ways. Some of our teachers, the critics of architecture, say we are creating a massless building, but to us at least the mass is still there. We are but trying to demonstrate how the mass is created.

A curtain wall can be any wall meeting all functions of a wall except its ability to carry a vertical load, and which encloses space of the building. Such walls can be created in many ways but they all, to satisfy their fundamental aesthetic principle, must show clearly that they are suspended from the frame and that they do not carry a vertical load. A piece of canvas laced in a pipe frame would best illustrate this principle.

Design considerations

At Philadelphia, the lot on which the Sheraton Hotel was constructed is long and narrow, 100′ x 400′, and is over the railroad tracks of the suburban station. An office building had been previously started on this site with a column spacing 18′-8½″ along the main direction of the lot. A height of 21 stories was thought necessary for commercial success. The most efficient plan of the bedroom complex called for a thin slab-like block. This form was also fashionable at the time. We demonstrated to ourselves that a steel frame would best support such a building using end walls for wind bracing.

A curtain wall between these ends seemed to meet our needs best. Because the curtain wall lacks depth of shadow, it was decided to emphasize the vertical members of the frame on the south wall where shadows would count. Here you will see two types of curtain wall displayed. The one set into the frame on the south and the other applied to the frame on the north.

The main block of the hotel above the fourth floor is made up of bedrooms. Bedrooms require a special treatment not typical of office buildings. Privacy and the ability to look out, while others cannot look in, is the governing factor in the walls of a bedroom; therefore, the window wall chosen must provide this. Its windows should not go to the floor or, if they do, they should be protected by balconies. The occupant needs to feel that if he falls down, he won't fall into the street.

A fairly high window stool was adopted which had depth enough to cover the heating and air-conditioning units. This high stool, and the bar-joist floor construction used, resulted in a wide spandrel which according to the Philadelphia Code (since changed) had to be backed with 8″ of masonry, the importance of which will be pointed out later.

There was another reason which led us to the curtain wall. A hotel is a meeting place, a temporary home, a place of festivities and in general should have a festive air. This can best be conveyed by flowers, gay colors, flapping pennants, awnings, lights and sparkle. To capture some of this in any urban setting, gay colors must be used in the walls. For this reason, a light mottled green panel with aluminum framing was chosen, the green being more of a typical metal color than others which might have been used, and one which also harmonized with the color of aluminum.

Materials selected

Aluminum was used for the basic grillage of the curtain wall, and either clear glass for windows or porcelain enamel fired on steel plates was used to close the spaces in the aluminum grid. As the wall had to have 8″ cinder block by law, heat loss was not a factor in this choice. Uneven surface reflections caused by an attempt to use a flat plane kept us from using structural glass, and lack of experience with the material kept us away from plastic. Expense ruled out thin slabs of slate or marble fitted into the frame.

Having decided to fill the grid with porcelain enamel, we still had to find some means of making the plates rigid against a one hundred mile an hour wind. Philadelphia lies in the area of potential hurricanes. The manufacturer of the porcelain enameled panels tried many experiments. The largest size panel was mounted horizontally in the aluminum frame supported on all four sides. It was then weighted with nuts and bolts until its ultimate design load was finally reached. After many failures the final star design was evolved. This method of rigidizing panels is easy to do. Simple tapering T bars were fastened to one plate of the press, the other plate was covered with stiff rubber. The steel panel was formed by pressing the T bars into the rubber. The resulting rounded forms are most pleasing and very strong. They break up reflections so the surface does not have to be true, they catch the light, and they prevent flutter.

Glass, aluminum and porcelain enamel used in thin sheets, as they are in curtain wall, build up heat very quickly as the sun strikes and lose it equally fast. There may be as much as 100° F difference in surface temperature between a cold night and a windless, sunny day in winter where the sheltered metal receives the direct rays of the sun. The resultant expansion and contraction present problems for the designer which must be met. Caulking must move, slip joints must slip, and both must be provided.

Sealants and connections

Having provided these joints, we raise another problem. They must be watertight. Not only must they keep the exterior water out but they must let moisture out of the building from the inside, otherwise condensation will ruin the curtain wall. Rain not only runs down but blows up; often great, rising drafts may be observed flying up the face of the building, carrying water with them. A polysulfide rubber-like compound used as caulking proved to be the answer to this problem. It was used to caulk the panels into the aluminum frame and, when a part of the north wall failed in a heavy tornado-like storm, the caulking held and pulled out the screws at the stop beads.

The aluminum grid, the basic element of the curtain wall, was fastened to the frame of the building by steel clips 3/16″ thick fastened with T slots and

bolts to the concrete fireproofing of the steel frame. Thus, the basic description of the curtain wall used at the Philadelphia Sheraton Hotel is an aluminum grid designed for expansion and contraction, fastened to the building frame with steel clip angles bolted to the T slots anchored to the concrete fireproofing. In this grid were either aluminum sash filled with glass or porcelain enameled steel panels. The steel panels were rigidized by their shape, enameled both sides, and set in polysulfide caulking with stop beads screwed on. Weep holes drained condensate from behind the panels whenever moisture ran down and met a horizontal line of flashing.

For ease of installation, the grid was divided into one-story heights vertically and into bays averaging six feet wide horizontally. They were installed from the outside and glazed after installation.

Performance experience

On June 26, 1958, a severe wind storm hit Philadelphia. It was sufficiently strong to sweep pedestrians off their feet and it emphasized for us a lesson which we knew, but which we had neglected to apply. The walls were designed to meet pressure from the outside but they also must resist pressure from the inside, since these great winds or explosions cause negative pressures as great as any positive pressure encountered. Experience in five hurricanes and in much bombing taught us that glass usually flies outward as a result of this negative pressure.

This is just what happened here. Two bays in from the west corner at the sixth and eighth floors, six steel clips holding the mullions of the aluminum grid to the concrete fireproofing failed dramatically. They had been cold formed at a sharp angle introducing a flaw in the metal and each sheared off at the bend as clean as if a hack saw had been used on it. This allowed the mullions to bulge outward, the steel panels pulled away from the grid and one flew across the street and punched a hole in a church roof. Others fell on our own roof. Fortunately no one was hurt. The bottom rails of the windows bowed at the stool but no windows let go and this failure was easily corrected by fastening the frames to the metal stools in the middle. The occupants of the rooms were saved from going into the street by the concrete block back-up, which had just been abandoned by the building code. Ironically enough, the evening paper which carried the announcement of the change in the law also carried the story and pictures of the failure, but the editors failed to notice the connection.

On investigation of this failure, we found the cold formed steel clips which failed were Z shaped, whereas the other clips in the area were U shaped. The U clips held, the Z clips failed. Only the U clips had been shown on the shop drawings, which we had approved, and no method of forming these clips had been shown or specified, although I doubt if we would have caught the fault in the method. We have examined, since this occurrence, drawings of curtain walls of four other major buildings, and in two of them we find Z clips, probably cold formed, supporting the grid from the building frame.

The manufacturer shouldered the responsibility and replaced the damaged section, took out the 56 undamaged Z clips remaining and replaced them with a stronger method of fastening.

Certain faults were noticed in the installation. When holes do not fit, they are sometimes enlarged by the workmen so as to weaken the surrounding metal. Porcelain enamel panels were forced in place by pounding with a hammer, and protective corru-

(Continued on page 18)

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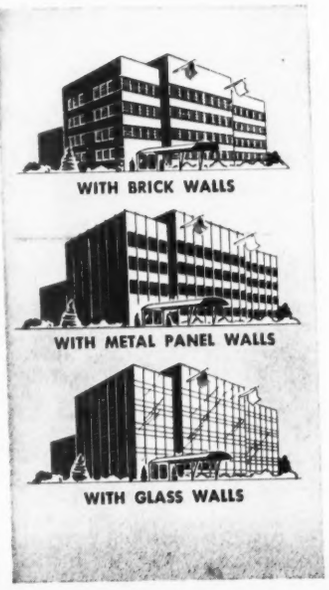

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SHERATON HOTEL

(Continued from page 17)

Close-up photo of portion of exterior wall of Philadelphia's Sheraton Hotel which failed due to negative pressures built up within structure during height of a severe wind storm which struck the city on June 26, 1958. Careful investigation disclosed that the cold-formed steel clips which failed were Z-shaped whereas other clips in the area were U-shaped—which held. (Photo by McCuen, Philadelphia Daily News.)

gated paper backers were allowed to fall down in the space between the backup and the panel and collect moisture and dirt. Our panels did not have enough tolerance to allow for poor workmanship in the frame and should have had more come and go in them so they might have been set more easily.

Maintenance

As for maintenance, we have requested the owners to wash the curtain wall, its aluminum grid and the porcelain enamel once a year. As the aluminum has a lacquered mill finish, we believe with proper care it will last as long as if it were anodized. When, in looking for signs of failure, we examined the panels where they had pulled away, we found no rust or any other sign of corrosion on them. The polysulfide material proved stronger than the aluminum screws and the aluminum stop bead. From what we saw, we believed we have a wall that will expand and contract and stay watertight. We believe that since the fault in fastening the curtain wall to the building has shown up and been corrected, there will be no further trouble.

Appraisal

Aesthetically we are not satisfied with the north wall. It lacks the depth which is given by the limestone piers on the south wall. Philosophically, the principle of the curtain wall is sound, but to us our handling of it is not satisfactory. Perhaps we should allow it to be zigzag or undulated in order to give it more play of light and shade. However, several later attempts by our office to solve this problem have not been as successful as this, which we feel is our best result to date.

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Maximum light distribution at low cost is achieved by ⅛" Pentecor glass, glazed in vertical sidewall sash in Clopton High School, Clarksville, Mo. Architect: Kenneth E. Wischmeyer, St. Louis, Mo. Glazing Contractor: Rainbow Glass Company.

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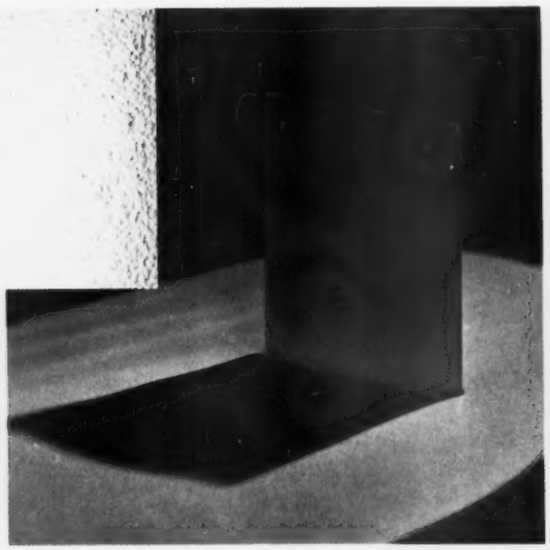

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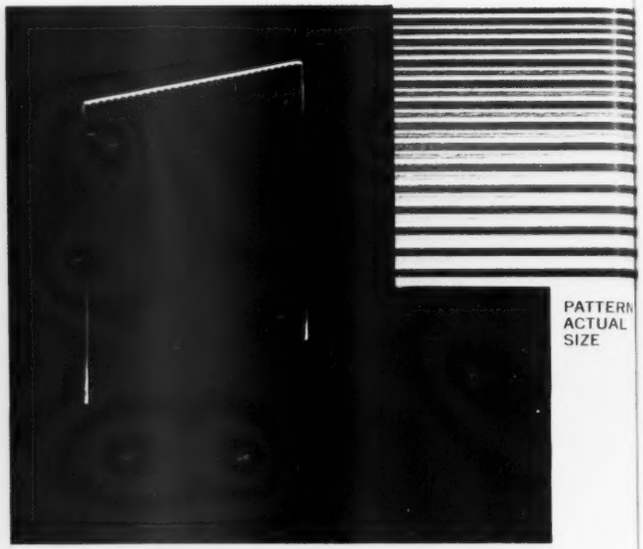

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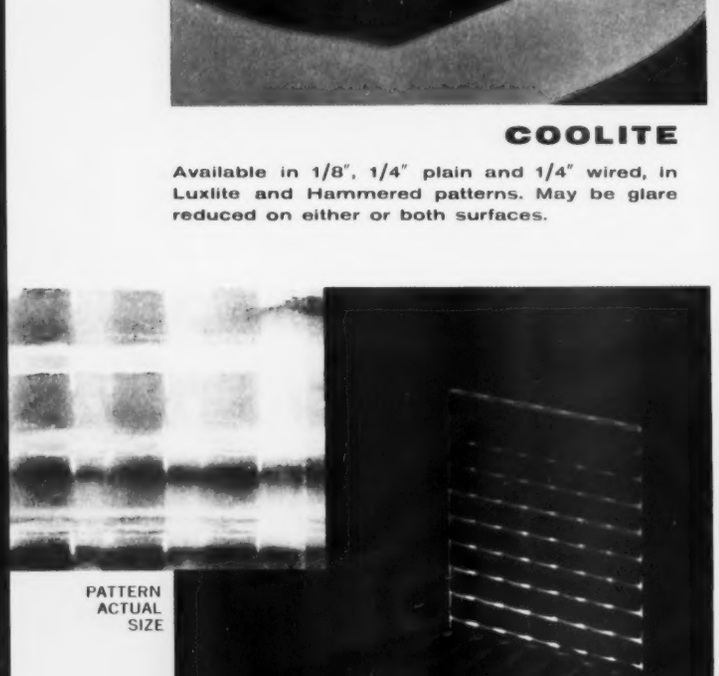

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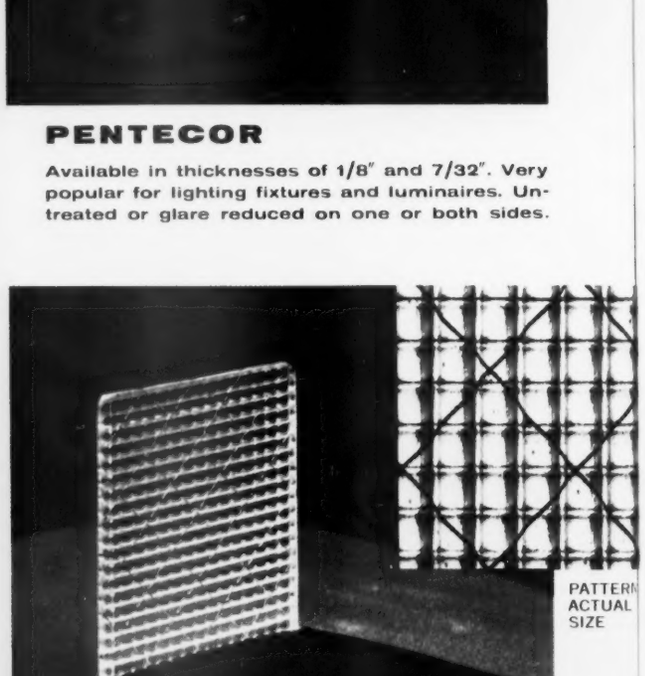

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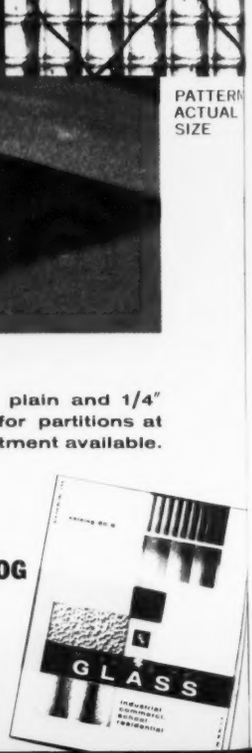

CURTAIN WALL DESIGN FOR EFFICIENT FIELD ERECTION

The design of a curtain wall for efficient field erection was the subject of a paper by Norman S. Collyer, President of the F. H. Sparks Company, Inc., of New York given before the 1959 Fall Conference on Design Potential of Metal Curtain Walls of the Building Research Institute, Washington, D.C.

As the structure to be enclosed is delivered to us and as we receive the materials designed to enclose the structure, it is impossible for us to be efficient. Our hope is that we may be able to complete the installation in some manner in spite of all obstacles. We may be successful, but we will never be efficient with the designs being handed to us. Let us look at some of the problems which need solving if we are to have efficient field erection.

Tolerances and clearances

Tolerance is, of course, the variations that occur in the size and dimensions of various members of the structure. Clearance represents the distance allowed or needed between adjoining parts of the structure.

The word tolerance usually implies a permissible or normal amount of variation, although the actual may be more. Thus the mill tolerances in a 5" x 5" steel angle may be about ¼" in either direction and the actual variations more. It is therefore stupid to talk of attaching aluminum extrusions directly to such an angle and expect a finished product within 1/16" or 1/32". Yet such details appear on drawings daily. An aluminum extrusion may be exact to dimensional size or thickness within a few thousandths. This same extrusion, however, may be twisted or out of line from one extreme to another in a 20' length by ½" or more. Large extrusions on a recent job produced by one of our best companies were consistently 5/16" off square. Since they were used opposite hand in an opening, this alone lost 5/8" from the opening size. An amount of 1/16" had been allowed for clearance between the four pieces making up the opening. These four pieces varied by at least 1/16", which is reasonable tolerance. The adjoining stone was 1/8" oversize. By cutting, fitting, and juggling in the field, these precision parts were put together on the building—but would one call this efficient field erection? And who can afford to pay for all this field cutting and fitting? When checking tolerances on any material, check not for the possible cross-section size variation but for the total variation in both directions from any given plane for the full length of the member. This is tolerance as the job must work with it.

I have touched on one of the clearance problems—namely, that between adjoining members of the wall itself. In a brick structure I suppose this would be the cracks in the mortar. In a metal curtain wall, it is the space that must be allowed between members to: (1) allow for manufacturing size variations; (2) permit expansion and contraction of the members; and (3) permit the erector to make up for size variations in the structure he is covering. Bear in mind that manufacturing variations on any particular job are normally all in one direction. You must accumulate all possible variations including size, out of square, and out of straightness for the full length of the member. Whether or not you care about expansion and contraction later, the erector must work with materials and temperatures as he finds them on the job, and this effects size. Even the best field engineers make mistakes, and we don't tear down the building frame because it's too large or too small. The wall has to be adjusted to fit, and this needs clearance.

The other important phase of clearance is the distance between the face of the structure and the nearest point on the metal curtain wall. At previous BRI meetings, it was recommended that this should be a design minimum of 2". Structural steel may vary 2" or 3" in either direction on a 500' high building and yet a well known architect on a recent 40-story job specifies 1/16" from a vertical plane for the metal wall and another specifies 1/8". A 45-story building we are now working on allows 3/8" from face of concrete fireproofing to the inside of the metal wall.

Examples in the field

Some of you will say that you don't have these problems because your jobs are only two, three or four-stories. A three-story building now in progress details the aluminum work fitting tightly to the top and face of concrete on three successive floors. The concrete contractor has amazingly stayed within 1/4" in height except for one brief aberration of 5/8". This is perfection, but what do we do with the 1/4" or 5/8"? The concrete is only out of line 1-1/4" in relation to the building line, but since the building is on a curve we can't relocate the fall which is a precision fit. Please note that fancy shapes may look good, but they complicate the field problems.

The one and two-story schools with light framing and lack of contractor engineering and supervision are the worst. Light, unbraced steel is difficult at best to keep plumb and in line, but our precision designers regularly show the aluminum wall fitting directly to steel H columns or lally columns which are commonly an inch or two out of line and plumb. If the column happens to be back from the wall, they show a one-piece closure between wall and column.

The designer usually establishes the size and weight of the units which will make up the metal curtain wall when he finalizes the design. He may say that he is leaving the composition to the fabricator, but actually he has so established the ground rules that the fabricator has little choice. As a guide, don't require a section to be larger than will go on the job hoist or heavier than can easily be handled by four men. If the various portions of a job go up in sequence, be sure that sizes and weights will permit proper sequence without one operation being limited by another.

Avoid the use of scaffolds for the installation of the wall if possible. Scaffold work is slow, costly, somewhat hazardous, and subject to weather delays. Most jobs can be designed for installation from the building floors without outside scaffolding.

Connection of curtain wall

Connection of the curtain wall to the structure can best be made by means of a two-piece bracket with slotted holes to permit adjustments in all directions. Portions of bracket should be bolted together and tack-welded after adjustment to prevent slippage. Connection to the building itself may be by welding, Nelson studs, powder driven studs, built-in anchor bolts, or bolts in slotted inserts, but should always allowed adjustments. Keep the attachment at floor level whenever possible.

Lines and grades

It hardly seems proper to discuss the problem of lines and grades as part of design. The design, however, sets the need for accurate lines and grades. The manner in which the curtain wall ties into adjoining parts of the building such as stools, convertors, venetian blind pockets, air ducts, pipes and other wall items such as glass and masonry determines to a great degree the required accuracy of the wall for elevation and alignment. All such adjoining elements must be carefully coordinated and detailed to fit together with a minimum of trouble and maximum flexibility both of dimension and timing.

Since lines and grades are used by all trades, they should be established, maintained and coordinated by the general contractor. There is a tendency today to push this responsibility more and more onto the curtain wall contractor. This will inevitably lead to confusion and trouble on the job if the general contractor does not maintain control of and furnish proper lines and grades to all trades.

Joints and sealants

No curtain wall story is complete or even plausible without something being said about joints and joint sealants. Joints are needed to permit field assembly of parts and for expansion and contraction. While it may seem good to make pieces large to eliminate field joints, I believe that within reason a small number of joints may cause more trouble in a given area than a larger number. The larger the number of joints, the less movement and the less variations we have to handle in any one joint. The size and type of joint to be used obviously must depend on size of sections and design. Careful thought should be given to the fitting together of the members during erection and the movement that will take place later. A joint whose members slip against one another is better than one where the members pull apart with movement.

The joint sealant may be a gun type mastic or a perforated tape or gasket. Preformed gaskets of any type must be positively compressed at the time of installation by some mechanical device in the design. Joints or splices in preformed gaskets must have some special form of field sealing. Regardless of the sealant, intersections of members at field joints must receive special attention by the erector. Special backing plates and sealants are required at these points. Whether or not an external sealant is applied at the time of installation, it seems good practice to provide a joint which will permit such an application at a future date without being unsightly.

Don't cheat on the sealant. The extra cost of using the best, properly applied in the beginning, will save money over the years. Remember, however, that the best sealant carelessly applied is no better than any other. Some of the best sealants are very difficult to apply and dangerous in the hands of an inexperienced mechanic.

(Continued on page 22)

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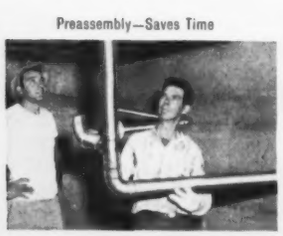

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CURTAIN WALL DESIGN

(Continued from page 21)

Glass installation

A vitally important part of any modern metal curtain wall and probably the most frequent source of trouble is the glass installation. Since the glass may represent almost 100 per cent of the exposed wall area and the joints around the glass may be far greater in extent than all other joints in the wall, it is evident that the glass should be treated as part of the metal curtain wall contract. Whether or not the curtain wall erector installs the glass, he is vitally interested in the glass installation. Frames, which are frequently quite flimsy, must be left square, plumb and true to receive the glass. On the other hand, the glass must be cut square and properly set and blocked or troubles may result with the frames.

The problems of sealing the joints between metal and glass are essentially the same as for metal-to-metal and can be solved in essentially the same manner with the same materials. We will not go into these problems here except to say that the standard putties and glazing compounds—even the best—are not adequate for the sealing of glass in metal curtain walls. We, as a glazing contractor, are now refusing glaze with these materials on curtain wall jobs.

Special finishes

More and more special finishes and special colors are being developed and used to add to the attractiveness of metal curtain walls. This is one of the designer's finest tools and one which I personally feel has not been exploited to its fullest possibilities. The handling of delicate finishes and colors presents many new problems for the erector. It is difficult to avoid some marring or scratching. Color variations delay the work while all concerned decide what to do about the variations. Frequently, sorting and relocating has been necessary. Jobs have been delayed. The manufacturer should be honest about variations to be expected in commercial production and the designer should resolve to live with the variations if he wants that particular color or finish. If this is not done, installation costs will skyrocket.

Having successfully fabricated and installed these tight fitting, highly colored and polished materials, we have the problem of keeping them the way we put them in. This can be difficult and costly with other trades working all around and the elements adding their toll. Much damage is done maliciously or carelessly because of a "don't care" attitude on the part of all concerned at the jobsite. In some cases protective coatings of some sort may be needed. Strippable coatings may be all right in some cases, but I have yet to encounter one that will stay on for months exposed to sun and weather and will strip off without leaving a troublesome deposit. Mortar and plaster will stain most surfaces if special protection is not provided. I believe that a careful program of protection and cleaning set up for each particular job with the full responsibility in the hands of the general contractor, who can control the job, is the only solution. The curtain wall contractors cannot prevent others from getting careless with the wall materials. The cheapest time to buy cleaning is after the job has been finished under careful control by the general contractor.

The designer sets the pace for the entire job from beginning to end. It is essential that the designer give more attention to the erector's problems if we are to have efficient erection of metal curtain walls and avoid future problems.

PROGRESS AND PROBLEMS OF SANDWICH CONSTRUCTION

From a paper given before the 1959 Fall Conference on the Building Research Institute on Sandwich Panel Design Criteria. The author, Albert G. H. Dietz, is an internationally known authority on the subject. He is Professor of Building Engineering at the Massachusetts Institute of Technology, Cambridge, Mass., and a member of the Building Research Advisory Board (BRAB).

Structural aspects of sandwiches

A principal reason for using construction sandwiches is the structural efficiency that may be achieved. When thin, hard, strong, rigid facings are firmly bonded to thick lightweight cores, the geometry of the combination may easily provide great strength and rigidity with a fraction of the weight or thickness that would be necessary if the facing material or core material were used alone (if, indeed, it could be used alone), or if they were not firmly bonded together. The thin strong facings provide the internal couples resistant to bending, the resistance to edgewise loading, and the resistance to racking, while the core resists shear and stabilizes the facings against buckling.

However, many of the present uses of sandwiches are only semi-structural; that is, the panels are incorporated into a structural frame which carries most of the load, and the sandwiches carry only the loads imposed directly upon them. Typically, such sandwiches are wall panels subjected only to transverse wind loads. They transmit these loads into the primary structural frame. Indeed, there appears to be a widespread impression that this is all that construction sandwiches can be expected to do.

For many applications this limited structural use of construction sandwiches is a penalty. For light construction, especially for houses and one or two-story commercial or industrial buildings, there is no inherent reason why construction sandwiches should not carry the entire loads and eliminate the structural frame. Many sandwiches not now so used could be, or could be made, capable of complete structural action with relatively minor modifications.

Thermal attributes

One of the most attractive features of construction sandwiches is their ability to provide high thermal insulation efficiency, that is, a low over-all coefficient of heat transfer, with minimum thickness. Many thermally efficient core materials are available that are also suitable from the structural standpoint. Indeed, some materials appear to be so thermally promising that the thickness of the sandwich is dictated not by thermal but by structural demands, or by other considerations such as minimum dimensions of door and window frames.

A second thermal characteristic of construction sandwiches is not always so happy. The materials of which sandwiches are composed are likely to have different coefficients of thermal expansion, and a change of temperature leads to different dimensional changes in the various parts of the sandwich. This may easily lead to distortion such as bowing or buckling. Furthermore, one side of a sandwich, such as the exterior face of a wall panel, may be subjected to considerably greater temperature changes than another side, and thermal gradients occur leading to differential expansion or contraction even if the various parts have equal coefficients. The result may again be distortion. Careful design is necessary if these effects are to be minimized.

Closely associated with thermal characteristics are moisture and its effects. Changes in temperature may cause changes in air pressure inside a sandwich with a corresponding pumping action leading to the infiltration of water vapor into the interior of the panel. Condensation may occur and provision must be made to get rid of the water, or to prevent its accumulation in the first place. Diametrically opposed procedures call for hermetically sealed panels (with resulting changes in air pressure inside) or open structures allowing for free entrance of moisture and free drainage.

Acoustics

Acoustical problems, particularly control of sound transmission, have tended to become more rather than less acute with the trend toward lightweight construction, continuous frames and slabs, open plans, and the use of space dividers, often movable. Sandwiches have contributed to this situation by providing lightweight strong panels for walls, partitions, space dividers, and other structural or semi-structural parts of the building. The heavier permanent construction formerly employed provided good acoustical barriers because of its mass. Today's lightweight construction tends to transmit sound readily.

The problem is to retain the advantages of lightweight continuous rigid construction and the flexibility of panels or similar movable units, and at the same time to provide good acoustical barriers and sound insulation. A re-examination of the fundamentals of sound transmission appears to be called for, and means must be found to provide high acoustical impedance without resort to mass. The problem is a pressing one; it is particularly important in the design of successful construction sandwiches and their systems of supports.

Systems

It is not enough merely to devise a sandwich panel. The panel must become part of a building, and some system of incorporating the sandwich into the building is therefore essential. The system can, as a matter of fact, become a crucial aspect, and a poor system of attachment can easily defeat an otherwise good sandwich.

Of first importance is flexibility. Whatever system is devised should be applicable to a wide variety of construction systems including steel, concrete, wood, and masonry. The system must accommodate itself to the dimensional inaccuracies likely to be found in the structure to which it is attached. It must adapt itself to windows, doors, and other openings. Although the sandwich system itself may be modular, it should adapt itself to non-modular designs. It must allow the sandwiches to be combined with other materials. Unless this kind of flexibility, combined with simplicity and speed of erection, is provided, the whole system of sandwiches and attachments may be seriously limited in application.

Architectural design

Construction sandwiches pose both an opportunity and a challenge to the architectural designer. The many materials that may be employed in them, the great range of patterns and colors, and the sizes and shapes available make for a considerable degree of flexibility. On the other hand, shop fabrication requirements usually demand that once a type has been decided upon, that type must be used in large numbers in order to reduce manufacturing costs. Shipping requirements restrict sizes, shapes, and weights. The panels must be fitted to other features such as windows and doors which are also shop-fabricated and must be used repetitively in large numbers.

A major problem in aesthetics is posed by these repeating units. Monotony can easily result from their unskillful use in endless rows, and the sharp criticism of "graph-paper architecture" seems too often to be justified. The design problem can be a severe one, but if successfully met, an aesthetically satisfying and at the same time efficient building can result.

Regulations

Sandwiches, by and large, are new. Building codes and other regulatory instruments in many instances have not caught up with the possibilities inherent in sandwich construction. Code provisions are likely to be so written as to make the acceptance of a sandwich system difficult. This is particularly true of the specification-type codes commonly found. Code officials are reluctant to depart from familiar practice even if their codes enable them to do so.

A major educational effort confronts the enterprise that introduces a sandwich system. Not only must architects, engineers, builders, and owners be convinced of the soundness of the system; code officials must also be shown. This is not always easy, especially in face of the public hostility that is not infrequently found when new, unfamiliar concepts are first introduced.

Materials

Many different materials have been employed in construction sandwiches, and others are being actively developed or explored. Among the facing materials are cement-asbestos board, aluminum, plywood, stainless steel, hardboard, porcelain-enameled steel and aluminum, reinforced plastics, high-pressure laminates, clear plastics, and reinforced concrete. Cores are equally diverse and include foams of glass, styrene, urethane, phenolics and other plastics; fiberboards; plywood; balsawood; grids of wood and metal; honeycombs; particle boards; mats of glass fiber; and expanded concrete.

An important material in many sandwiches is the adhesive employed to bond the various materials together. Structurally, the adhesive must be able to withstand many repetitions of significant shear and tensile stresses as the sandwich is subjected to loads of various kinds. It may have to be completely waterproof, capable of withstanding high and low temperatures, and resistant to attack by molds and animal organisms.

Many of the adhesives employed in construction sandwiches are based upon synthetic resins, thermosetting or thermoplastic, often combined with other materials such as rubber. Not all are synthetic, however, and various of the adhesives are based on naturally occurring materials including asphalt. Strength, durability, and sufficient flexibility to take up the differential strains are the chief design requirements of a good adhesive.

Sealants and gaskets

Sealants and gaskets have become such important components of buildings, and there is so much activity in this field, that these materials are considered separately by the Building Research Institute. Several conferences on the subject have already been held. Sealants and gaskets are unquestionably of first

The phone call every architect hates to get

It begins, "This curtain wall is leaking like a sieve." It ends, "What kind of an architect are you?" What can you do about curtain wall leakage, anyway?

Caulking or sealants? Only as good as the man handling the materials. The life of these materials varies, but it's never long enough to eliminate maintenance.

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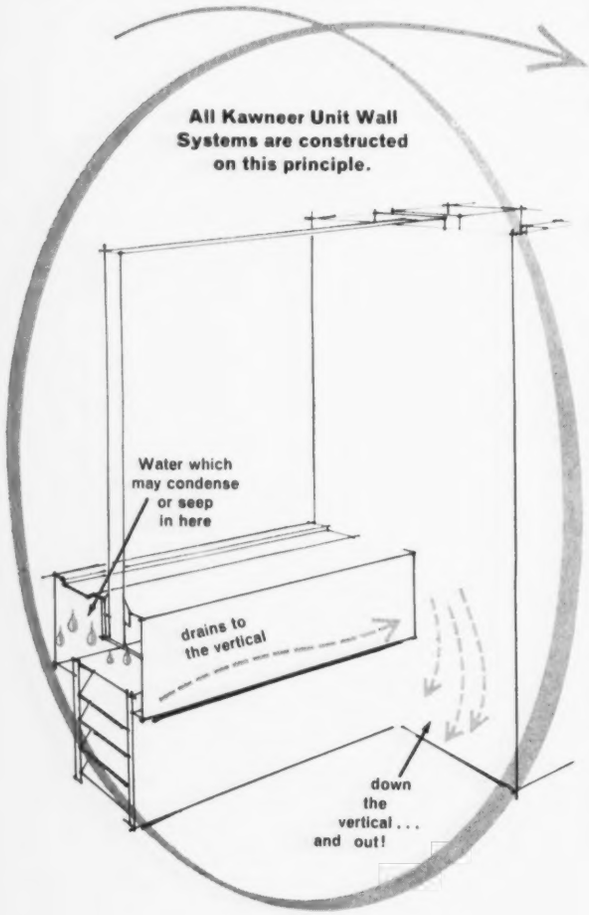
Internal Drainage Provision? That is, diverting the water that enters, or condenses inside the curtain wall system. This approach makes the most sense to Kawneer.

And we make the most of it in our Unit Wall Systems. These systems are designed to keep out the elements and to accommodate thermal action and building movement. Of course, they are caulked at the perimeter and glazed with sealants, Vinyl or Neoprene.

But here's how the water that gets past the sealants, or condenses inside the system, is handled.


All Kawneer Unit Wall Systems are constructed on this principle.
Water which may condense or seep in here
drains to the vertical
down the vertical . . . and out!

1. In Series 1000, 2000, and 3000, the moisture is directed to the vertical and down the vertical to the sill, where positive baffling by use of an aluminum sill leaves no alternative for the moisture. It must go outside.
2. In Series 4000 (our multi-story system), control is exercised by expelling the water from the system every couple of floors. This procedure assures no large water build-up anywhere down the wall.

These Kawneer Unit Wall systems have other advantages, too. They are completely factory-fabricated, so that the only "on-site" labor involved is attaching them to the building and each other. Therefore, you are assured that your money is being spent on wall quality rather than man-hours.

If, for some reason, our Unit Wall systems can't be used, we'll supply our Window Wall. Like others, it provides no internal drainage. Unlike others, it includes the Kawneer Sealair Window, an architectural window.

For simplicity and low cost on single story jobs or as walls adjacent to entrances, Kawneer provides flush glazed, weathered Narrow Line framing in 3", 4½" and 7" depths.

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PROGRESS & PROBLEMS

(Continued from page 23)

importance in any system employing sandwich construction. For exteriors, in addition to providing weathertight joints, they must exclude dust, help to stop airborne noise, and provide cushions to prevent squeaking and other noises as panels expand, contract and move under load. For interiors, weathertightness is not important, but barriers against sound transmission and cushions against noise generation are, and sealants and gaskets must be relied upon.

Severe conditions may be imposed upon sealants and gaskets. Panels expand and contract with changes in temperature, humidity, or both. A thin basket or caulked joint may therefore easily be subjected to tensile and compressive strains of 50 per cent or more. The joint is expected to remain tight at high and low temperatures. The material must bond or press tightly against the adjacent panels, it must not stiffen enough to crack at low temperatures and it must not sag when hot. It must have extreme resistance to fatigue stresses and it must not deteriorate for long periods of time when exposed to all extremes of sunlight, moisture, freezing and thawing. It must preferably be easily applied. It is small wonder that this is a highly critical area in which much is still to be done.

Shells and other structural forms

There is perhaps a natural tendency to think of sandwiches in terms of flat panels, used primarily as fillings in frames or, at most, as flat wall and roof sections, possibly carrying a major part of the load. In any event, the panel is itself conceived as a rather simple affair of facings and cores with edging strips making edge attachments possible.

It may be that in the future some of the best uses of sandwiches will be in other than simple flat panels. With the trend toward large clear unobstructed spaces comes a requirement for shapes capable of spanning long distances, and fabricated of lightweight materials to minimize dead loads. Folded plates and a variety of shells lend themselves particularly well to these requirements. Both can make excellent use of the principles of the sandwich.

In folded plates, such as the familiar sawtooth configuration made by tilting at plates against each other and rigidly fastening the edges, it is necessary to transfer bending moments, shears, and direct stresses along the edges, and the flat plates themselves are subjected to a variety of planar and transverse moments and shears. The geometry of the sandwich with its stabilized skins, shear-resistant core, and rigid geometry, lends itself well to these requirements, and the low unit weight is a considerable asset where spans are large and the dead weight of the structure tends to become a major part of the total load. Perhaps even more versatile than the folded plate may be the various shells, including domes, hyperbolic paraboloids, vaults, and the like.

Sandwich shells should lend themselves to many other structures. It is not difficult to conceive of foamed cores of many configurations with sprayed-on facings of fiber-reinforced plastics or of reinforced concrete to provide long-span structures to house a great variety of activities. The core can thus act not only as the core of a sandwich but as the form upon which the structure is built. The combination of strength, rigidity, lightness and formability should lend itself well to the structural forms that appear to be evolving for the future.

HOW TO SPECIFY STAINLESS STEEL

The Committee of Stainless Steel Producers of the American Iron and Steel Institute, in an article especially prepared for this publication, presents a series of criteria and recommendations that may prove to be a useful guide to architects and specification writers. The photo is of the service-core tower of newest addition to the Gateway Center Building complex at Pittsburgh, Pa. Harrison & Abramovitz of New York City were the architects, and George A. Fuller Co. was general contractor.

A recognized construction material for 25 years, stainless steel's use has increased rapidly in architecture during the last few years. Three factors have prompted the metal's growing importance—one is the trend towards light, free designs, as best exemplified by curtain wall construction. The second is the growing knowledge about the forming of stainless steel on the part of architectural metal fabricators. Third is the awareness by architects of the special design and detailing possibilities which can reduce the cost of using stainless steel in building. In many cases, architects are now specifying stainless steel components at comparative costs or at a premium so low that is easily amortized by the metal's low maintenance costs.

Most architects are aware of stainless steel's lasting and elegant appearance. However, some may not realize the variety of finishes and treatments—polishing, coloring, texturing—made available in the last few years to provide opportunity for greater individual expression by the designer.

Types of stainless steels

To meet a multitude of engineering applications, some thirty-seven types of stainless steels are considered standard by industry. Of these, an architect or architectural specification writer need concern himself with only four or five.

Type 302 stainless steel—the famous "18-8"—can be considered the all purpose grade. Typical mechanical properties in sheet form are 40,000 pounds per square inch yield strength and 85,000 psi tensile strength. Type 304, which sometimes appears in specifications, is a close relative. Type 302 is easy to form and fabricate. Weldments are strong, tough and corrosion resistant, and blend with the parent metal when ground and polished. Possessing excellent resistance to atmospheric corrosion, it is the grade normally used for exterior architectural applications.

Type 316 stainless steel is a modification of Type 302 to which molybdenum has been added to further increase corrosion resistance. In extremely exposed sea-coast applications, or industrial atmospheres where corrosive chemical fumes are exceptionally severe, savings in maintenance or increased service life warrant extra alloying.

Type 430 stainless steel closely resembles Type 302 in fabrication and service. It does not have quite as much corrosion resistance as Type 302. Nonetheless, it has suitable resistance to weathering and atmospheric corrosion for mild industrial and urban conditions. Extra care may be required to maintain its appearance throughout years of service. However, major architectural work has been done with this grade and it is particularly useful in store fronts and entrances which generally receive more maintenance. Type 430 stainless is satisfactory for practically all interior applications.

Types 301, 201, and 202 stainless steels are higher

HOW TO SPECIFY STAINLESS STEEL

(Continued from page 25)

strength grades that find principal use for structural elements. Roof drainage, window and door sections, ceiling systems and other applications which require high strength-weight ratios often utilize these grades.

Valuable properties

As a structural material, stainless steels are superior to all other architectural metals. Most architectural components are formed from stainless sheet and strip with tensile strengths normally available up to 120,000 psi, with still higher strengths possible for heavily stressed members. Stainless steels can and should be used in thinner gauges than other metals for optimum economy. In addition, their excellent resistance to corrosion means that no design allowance is needed for future reduction of thickness due to corrosion.

The hard, dense surface of stainless steels resists scratching and gouging better than softer ferrous or nonferrous metals. Again, this means that there is no need for extra material as a safety factor. The coefficient of thermal expansion of the stainless steels compares favorably with that of glass and other commonly used architectural materials.

Stainless steel is visually compatible with other architectural materials. It blends, yet contrasts subtly, with brick, stone, wood, glass and other metals. Stainless is *physically* compatible with other architectural materials, too. It withstands the alkalies and caustics in lime and mortar, and can therefore be used in direct contact with brick, stone or ceramics. Stainless steels can be, and are, washed with the most active detergents used in window cleaning. There is no need to protect or refinish stainless steel window frames.

Available in all forms

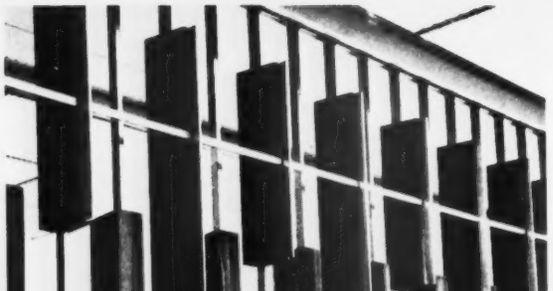
Stainless steels are produced in virtually all commercial forms and sizes in which other metals are available. Stainless steel bars and wire are not only produced in a wide range of sizes for standard shapes —round, square, hexagonal, and the like—but in many special shapes as well. Tensile strengths of 75,000 to 125,000 psi., or higher if needed, mean that structural function can be incorporated with decorative beauty in floating stairways, grills and guards, hardware and similar applications.

Stainless steels are produced in the form of tubing, both welded and seamless. Welded tubing is made up to 30" diameter, seamless to over 8" diameter. Tubes are made round, square, rectangular and in a variety of less common shapes, many of which have lent themselves to architectural adoption with spectacular results.

The basic efficiency of tubular shapes, coupled with the high mechanical properties of the stainless steels, leads to light, efficient designs in railings, dividers, shelving. Tubing provides strength and stiffness without bulk for window and door components, mullions and exposed supports. Most architectural product supply houses now stock special sections as well as standard rounds in a variety of sizes.

Sheets and strip are, of course, the products most often formed into architectural components. These products are available in practical architectural thicknesses from .010-inch (or as low as .001-inch for special applications—weather stripping, for example, at .005-inch to 3/16-inch.) Heavier plate material also is available, though usually confined to full load-bearing structural members.

Sheet dimensions are normally controlled by fabricator tooling size, or component shipment and erection size, rather than by mill product availability. In general, these are the same restrictions which apply to all architectural metals.



Visual and physical compatibility with architectural materials such as stone, wood, glass and other metals permits a universal use of stainless steel. Here, in the National Bank of Detroit, slender stainless members link together and highlight dark teakwood panels in a decorative screen for the mezzanine. Architects: Albert Kahn, Associated Architects and Engineers, Inc., Detroit, Mich.

Stainless rod can be supplied in tensile strengths of 75,000 to 125,000 psi, and higher if required, to present a combination of beauty and strength. This floating stairway in the new American Society for Metals Building at Novelty, Ohio is a good example. Architect: John Terrence Kelly, Cleveland, Ohio.

Wide variety of finishes available

The durable surfaces of stainless steel can be finished to meet virtually any architectural requirement. And the finish can be expected to give decades of service with little or no maintenance except as might be desired on occasion for aesthetic purposes.

A variety of standard finishes obtainable from stainless steel producers vary from non-reflective to an almost "mirror-like" polished surface.

Three finishes available on stainless steel sheets are of primary interest to architects:

No. 2D is a cold-rolled finish with a soft, non-reflective surface. This grade is usually preferred for large flat areas such as curtain wall spandrels, column covers and the like. It also has had successful application as flashing, coping and other components where a soft color is desired, or no special finish requirements exist.

No. 2B is a bright, cold-rolled finish similar to, but somewhat brighter than, 2D. The surface is moderately reflective and is often specified for gentle highlighting in mullions, column covers (normally above ground level) and standard or special windows. Type 430 is a 2B finish, particularly bright and often specified for store front application because of the minimum polishing or buffing needed to achieve a high finish.

No. 4 finish is obtained by grinding and polishing with abrasives, finishing with a 150 grit. It has a grained, bright, smooth finish. Because the finish is obtained by grinding and polishing, it can be produced after fabrication. This is the finish often specified when welds must be blended, or fabrication marking removed for eye level installations. It is the normal finish for entrances, column covers, interior and exterior trim, and all traffic-resisting applications.

Special finishes

While standard finishes applied at the mill are usually more economical, variations of surface appearance can be obtained through use of different polishing techniques, mechanical working, or application of color to stainless steel surfaces.

Surface texturing and coloring are two special treatment techniques which permit design variability and help solve detailing problems. Surface texturing can be produced by press brake or die operations to develop special patterns or effects. But generally, it is obtained through the use of "semi-fabricated" sheet material which has an over-all texture produced in its surface. This texture can take two forms. It can be coined or embossed into one surface only to deflect light and eliminate any undesirable reflections; or the texture can be produced between mating rolls which force the metal into a three-dimensional texture, adding stiffness while giving an over-all surface treatment. Use of this process, with deep patterns, often permits reduction in gauges without danger of distortion in relatively large surfaces.

Coloring can be obtained through a variety of systems. Black is perhaps best obtained through chemical treatment of the surface. Other colors are developed by coating with thermo-setting acrylics, by porcelain enameling, or other proprietary systems.

The corrosion resistance of stainless steel makes it possible to combine colored and uncolored areas either on flat or textured panels. Textured panels can be colored and then highlighted by grinding the color

from raised areas. Stainless steel will not corrode in exposed areas or under edges of color, and assures freedom from induced spalling, peeling or flaking.

Design criteria

If the stainless steels are to be utilized efficiently and economically, their superior properties must be taken into account in basic design. Design of components must be based on the properties and formability of stainless steel, not only criteria developed for other materials. For instance, structural or load-bearing components such as mullions, door and window sections, often can be roll-or-brake-formed of thin stainless steel sheet or strip. The same component designed in another metal might require a heavy extrusion.

Because architects specify stainless steel for many applications involving a wide range of loading conditions, and since appearance usually is a critical factor, detailed recommendations for minimum thickness of stainless steel are not feasible. However, the architectural specialists of the stainless steel producers, and many competent stainless fabricators, are always ready to assist in preparing specifications or reviewing proposals.

Reflections

The control of reflection is a common problem with sheet materials. Non-ferrous metals and glass, along with highly-finished stainless steels, can present aesthetic difficulties when large areas give distorted reflections. The problem of controlling distortion is greater when using stainless steel than other metals because the reflective surface will maintain its luster longer and the material can be used in extremely thin sections. The most basic and effective control of distortion is to avoid or minimize large plane areas. Many methods have been tried and proved workable.

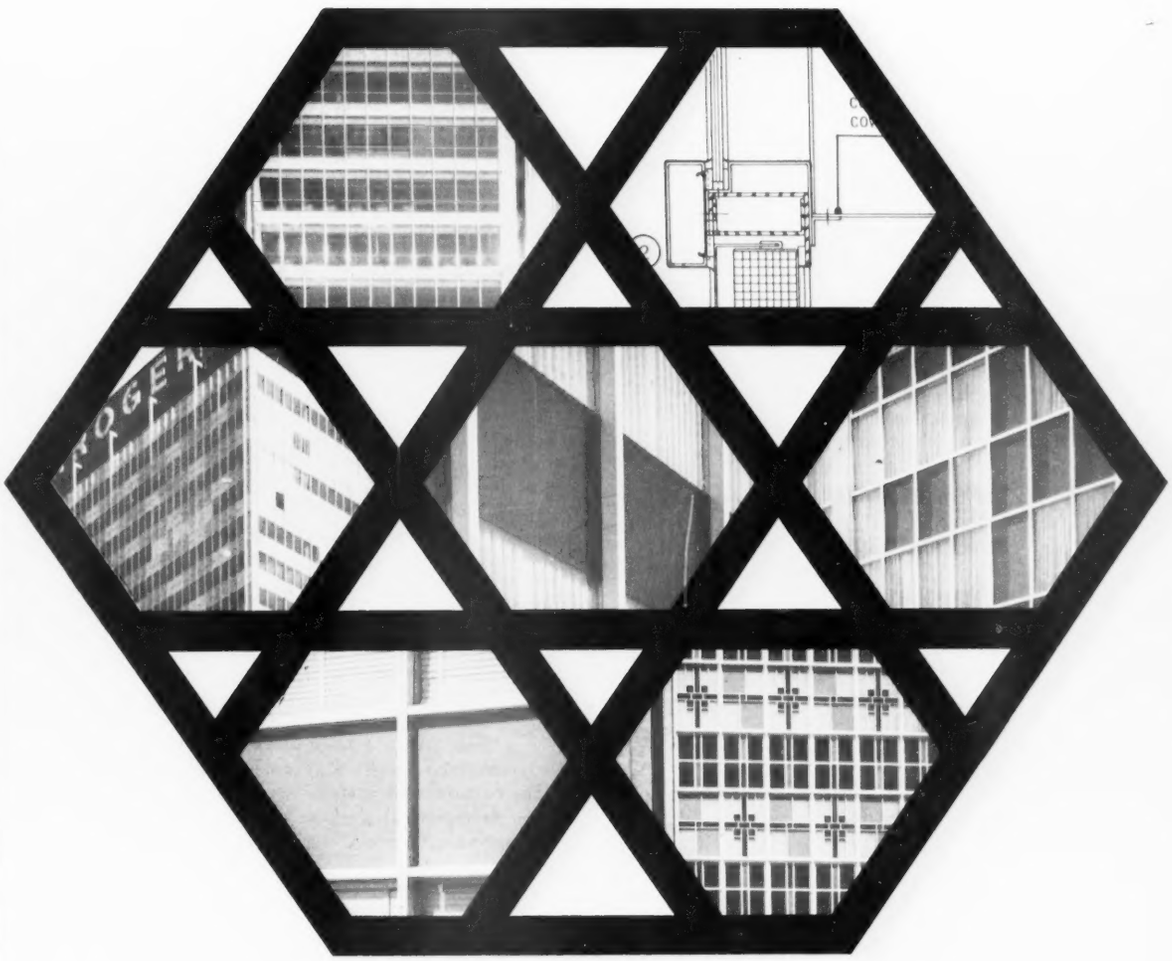
The Heppenstahl Building in Pittsburgh is completely faced with a solid, unbroken wall of stainless steel. In this case, a series of slightly concave panels were used. Incidentally, this building, in the heart of Pittsburgh's most industrialized area, is kept in "mint" condition by an annual washing which requires only 15 man days. The same technique is used on many well designed column covers.

Manufacturers of standard curtain walls use ribbed or fluted panels. There are several applications of die-pressed panels in which the metal was caused to flow and stiffen the panels.

The Columbus and Southern Ohio Power Building Columbus, Ohio, has an over-all rolled-in-texture pattern, as does the Union Carbide Building in New York City. In this latter case, the stainless steel has been blackened as well.

Ordinary corrugations, or simple vertical planes, accentuated with color, as in the case of the New York Power Authority Building in Niagara, the Four Gateway Center Building in Pittsburgh, give style, freedom from distortion and economy of material. These same principles can be applied to a column cover as well as to a wall area.

The development of durable color coating on stainless steel has opened new design potentials. Porcelain enamel, acrylics and related coating materials are reported to adhere more effectively to stainless steels than to other materials, because of the corrosion resistance of the steel itself. This same corrosion resistance makes possible the use of discontinuous coatings—in which both color and natural metal finish complement each other. One recent installation of this is on a steel company research building. Another is in the American Iron and Steel Institute office in New York City.



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POLYSULFIDE SEALANTS PERFORMANCE POTENTIAL DESIGNED PROPERTIES THROUGH RESEARCH

By Mr. Abe I. Tenzer, Head of the Elastomer-Polymer research laboratory of the Sonneborn Chemical and Refining Corp. His work is devoted to the development and introduction of high polymers and elastomer products to the construction industry. His work covers research and development in the field of Thiokol rubber, epoxy resin, synthetic rubber and polyurethane.

Mr. Tenzer received his B.S. in Chemical Engineering from the "Technion" Israel Institute of Technology and did graduate work in polymer chemistry at Columbia University. Mr. Tenzer is an active member in the A.S.T.M. Committee C-24 on Joint Sealants, American Chemical Society and is the author of numerous technical publications.

SUMMARY

Polysulfide (Thiokol LP) base sealants have become an integral and vital component in the functioning of curtain wall systems. The recent advances in sealant technology resulted in the introduction of a new class of sealants that exhibit higher performance potential, superior elastomeric properties and longer service life. A detailed discussion of the elastomeric properties is followed by an analysis and evaluation of the new improved Polysulfide Sealants.

The rapid development and common acceptance of the curtain wall systems by the construction industry originated the development of the two-component polysulfide (Thiokol LP) base sealants. The conventional oil-base caulking compound failed completely to seal the dynamic moving components of the curtain wall systems, and the polysulfide base air craft sealants were adopted by the construction trade to solve the immediate sealing problems. Today, looking back, we can state that the polysulfide base sealants have in general performed satisfactorily; certain failures reported in the field have been traced to the faulty application, scalely substrate and improper sealant formulation. Nevertheless the improved and "tailor-made" polysulfide sealants are recognized and accepted as an essential component of the curtain wall system.

The first general purpose polysulfide formulation was used as a "cure-all" sealant to solve every problem in any active joint. Modern research has now developed new classes of sealants based on Thiokol LP, Thiokol LP epoxy modified Thiokol polymer, Thiokol-Copolymer, etc., each designed to exhibit distinctive physical and elastomeric properties for specific purposes. Today the chemical manufacturer has developed his own sealant formulations through theoretical and empirical research as well as experimental studies and practical applications. Furthermore, today the research laboratories of the reliable manufacturers have contributed major advances in developing the new field of sealants technology. This new and challenging field utilizes the studies of the construction and joint dynamics and translates them into basic terms of rubber rheology and dynamic fatigue. There is no need today to judge an effective sealant in general descriptive terms; its effectiveness can be described through mathematical relations and calculated numerically.

The advanced improved Thiokol LP sealant formulations will offer to the trade a variety of sealants, designed for specific applications exhibiting improved properties to assure superior performance and longer service life. Need for detailed performance sealant specification.

The architectural trade takes for granted the elastic abilities of the Thiokol LP base sealants to perform successfully in every active joint. Frequently we meet in practice with a descriptive detailed specification of the type, "Joints should be sealed with a two-component Thiokol LP base sealant—as manufacturered by—and should be applied strictly according to the manufacturer's direction." In other cases, we read in the architect's specification, "The two-component system should contain at least 66 per cent Thiokol, and should exhibit a Shore "A" hardness of no less than 10 and no more than 30."

These two examples serve to illustrate three major misconceptions. The first specification assumes that all the polysulfide (Thiokol LP) sealants have equal performing capabilities no matter who formulates the compound. This is equivalent to the statement that all cakes taste alike because they are made of white flour and are baked in an oven. The illogic in this deduction becomes apparent from this analogy. The commercially available Thiokol base sealants differ considerably and fundamentally in their performance potential because each manufacturer has progressed to a different extent in his knowledge of elastomeric sealant technology. Each and every sealant on the market has its own unique elastic and chemical properties.

The second specification tries to be more scientific and the writer states two criteria for the quality of the Thiokol sealant, namely, the polysulfide (Thiokol LP) content and the range of Shore "A" hardness.

The Thiokol content of a sealant is an important consideration in determining the performance potential of a joint sealant. However, the Thiokol content alone does not gurantee successful performance. For example, in the rubber industry the amount of rubber in a compound is not the sole criteria for the successful performance of the product. A tire tread made of pure rubber would last only a few days on an automobile; a critical balance of fillers, plasticizers and accelerators is necessary to insure abrasion resistance. A flexible hose, based on pure rubber will deteriorate and craze after only a few days exposure to sunlight; addition of only small amounts of proper additives will protect the product for several years of life. In these examples, it is the skill of the rubber technologist to modify the basic properties of the polymer that really account for the desired resultant properties of the end product. The exact same principles apply in the field of sealant technology. The mere requirement of 66 per cent Thiokol content will not in any way assure successful performance of the sealant.

As for the specified range of Shore "A" hardness as a criterion for the quality of the sealant, we will agree with the general intention of the specification writer. However, the advanced methods of evaluation used today in sealant technology have proven that the rate of change in the Shore "A" hardness and the absolute value of the sealant hardness after accelerated aging bear a significant correlation to the sealant's performance capabilities. In contrast, the original Shore "A" values bear no correlation to the performance potential of the sealant. Even more important is the fact that the conventional Thiokol LP base sealants (as differentiated from the improved sealant) will increase in hardness after accelerated aging to the extent of 50-250 per cent. From this it becomes apparent that the mere citation of an initial Shore "A" hardness value bears no relation to ultimate performance of the sealant. One should bear in mind that the successful performance of the joint system depends not only on the dimensional design of the joint and the sealant shape, but is also governed by the elastic properties of the sealant rubber mass.

(Continued on page 31)

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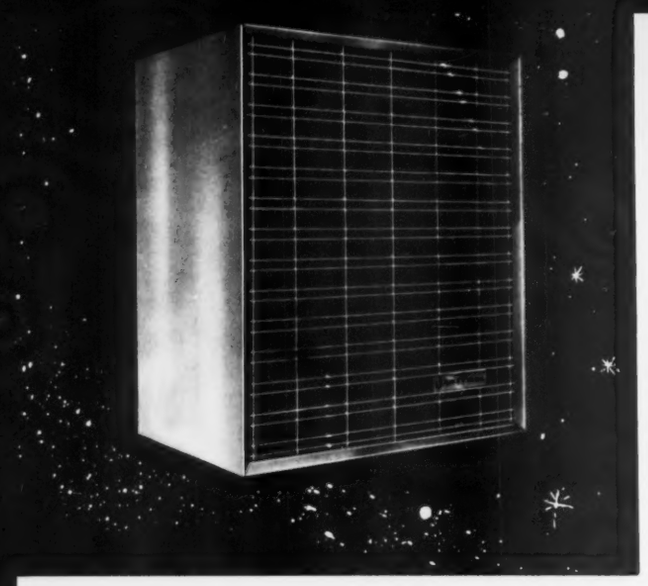

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POLYSULFIDE SEALANTS

(Continued from page 28)

Therefore, it becomes the responsibility of the architect and specification writer to specify clearly and definitely the type, physical elastic properties and the performance potential of the sealant he needs for a specific job. A good functional specification should include the distinctive elastic units and properties that will define scientifically the absolute performance potential *of the required sealant.*

It is our intention to cover and explain in the following discussion the basic theoretical concepts used to evaluate, calculate, and represent the absolute performance potential of the improved joint sealants.

DYNAMIC PHYSICAL CHARACTERISTICS OF CURED POLYSULFIDE BASE SEALANTS.

Polysulfide (Thiokol LP) base sealants are defined and advertised by the trade as elastomeric, synthetic rubber liquid polymer sealants. Yet the specifications for their use do not utilize the basic concepts of elastomer or rubber technology to define the properties of these elastomeric sealants.

Polysulfide sealants are formulated in two components (base and activator) neither of which is elastomeric in any way or form. Upon mixing the two components a chemical curing reaction starts and continues after the application of the sealant in the joint cavity. The curing reaction changes the linear Thiokol polymer into a 3-dimensional synthetic rubber exhibiting elastomeric properties. The key to a true understanding of the performance of polysulfide Thiokol base sealants depends, therefore, on the understanding and evaluation of the physical properties of the cured elastomeric sealant.

The term "Elastomeric Properties" is not yet practically defined despite discussions and efforts made by rubber technologists over the last century. However, the basic concepts of the dynamic physical properties of elastomers are derived from the tensile strength-extension (stress-strain) relationship.

To carry out such stress-strain studies, the polysulfide sealant is cured between two concrete or metal blocks for 7 days at 75°F @ 50 per cent. Relative Humidity to achieve optimum physical properties. The test assembly is placed in the jaws of a tensile testing machine (Scott Tester, Instrom). Constant tension is applied to the blocks at a predetermined rate (0.1-0.2" per minute). The per cent change in elongation of the original sealant is recorded simultaneously with the tension exerted on the sealant at the specific elongation. The test is continued to the point of rupture in the system. The failure may occur at the interface between the sealant and the block surface indicating an adhesive failure, or may occur in the sealant mass pointing to a cohesive failure.

TENSILE STRESS is the tensile load per unit of original cross-sectional area, withstood by the sealant specimen at any given moment. It is expressed as lbs. per square inch (P.S.I.).

EXTENSION is the change in length produced in a longitudinal section of the sealant, by the tensile load. It is expressed as *percent elongation* or percent change in length per original length. i.e. an 100 per cent elongation will correspond to a 2" final length of a 1" original specimen.

MODULUS is defined as the tensile stress at any given extension. Thus Modulus 150 refers to the tension load required to cause an extension of 150 per cent.

TENSILE STRENGTH is the tensile stress required to break the sealant specimen and defines the maximum tension sustained by the sealant during the test. A cohesive failure represents a break in the rubber sealant while an adhesive failure occurs at the substrate sealant interface and defines the *BOND STRENGTH* of the system.

ULTIMATE EXTENSION is the extension recorded at the moment of rupture of the sealant specimen. This is expressed as *PERCENT ULTIMATE ELONGATION.*

TENSILE STRESS-STRAIN CURVE is the curve obtained by plotting the tensile stress as ordinate against corresponding unit extension (percent elongation) as abscissa for the entire course of a tensile test. We will refer to this diagram in the future as the Tension-Extension diagram.

MODULUS OF ELASTICITY is defined as the ratio of tensile stress to the corresponding extension within the elastic limit. It is the slope of the tensile-stress-strain curve in the Tension-Extension diagram. Modulus of elasticity is synonymous with *stiffness.*

EXTENSIBILITY can be considered as the reciprocal of *stiffness*; thus a sealant with a high modulus of elasticity is low in its extensibility or requires a high tension to create a certain change in elongation. A low modulus of elasticity indicates a high extensibility system.

RESILIENT ENERGY is the actual physical work absorbed by the sealant during the Tension-Extension cycle and is identical to the energy exerted by the test machine to rupture the system. This elastic performance energy is calculated from the Tension-Extension diagram. The integration of the area enclosed by the Tension (force) X Extension (length) will express the resilient energy of the sealant. This is expressed as resilient energy units (P.S.I. X% elongation). The resilient energy is an absolute criterion of performance and is not dependent on the failure character (cohesive or adhesive). In the case of a cohesive failure the resilient energy will represent the maximum performance potential of the sealant compound itself. However, in the case of an adhesive failure the recorded resilient energy can be changed by increasing the bond strength of the sealant to the substrate. In any case the resilient energy is a true absolute measure of the elastic performance of the system under a certain set of conditions.

ELASTIC RECOVERY is the ability of the cross-linked sealant to recover from a constant external deformation. The elastic recovery is a measure of the cross-linking density of the system. A higher degree of recovery indicates a higher degree of cross-linking or chemical cure that will result in a better fatigue modulus and superior performance of the sealant. The elastic recovery depends on the test temperature and is particularly sensitive to low temperature due to the formation of crystal structure in the rubber sealant. The elastic recovery is lost completely at the brittle point of the rubber. This elastomeric property is expressed as percent recovery or the ratio between the recovered length to original length. The elastic recovery is an essential criterion in the evaluation of the performance potential of an active joint sealant.

HARDNESS is defined as the ability of a substance to resist penetration. However in rubber technology hardness is also a cross-linking index. It is not an exact measure of a definite property but serves as an indication to the degree of cure of the rubber. The hardness can be measured by different methods: the Shore "A" scale is generally used in rubber and sealant technology. A higher Shore "A" usually reflects a higher degree of cure and a higher modulus of elasticity. A lower Shore "A" value will indicate a soft rubber, high extensibility and low modulus of elasticity. Furthermore there is no correlation between hardness and original resilient energy values for sealant systems. An interesting correlation between ultimate elongation and hardness after accelerated aging was developed by the writer.

The general definition of the dynamic physical properties of cured polysulfide sealant will enable us to further advance in sealant technology in the evaluation and performance potential of sealants.

The elastomeric requirements for joint sealants

The prime requirement of a rubber joint sealant is to act as an elastic bridge between the interface of the joint materials. The joint is designed to absorb by its *elastic resiliency* the dimensional stresses exerted on the joint by materials of construction with different coefficients of expansion, or any other thermal movements or mechanical vibrations.

The 1953 committee on joint materials in concrete pavement (HIGHWAY RESEARCH BOARD BULLETIN #78) tried to summarize the questions in the following statement. "There should in fact be a proper relationship between (1) the amount of change in joint width, (2) the capabilities of the sealing materials, and (3) the width of the joint space."

This general statement could be translated into elastomeric terms by stating: the sealing material shall exhibit an ULTIMATE ELONGATION HIGHER THAN THE MAXIMUM EXTENSION exerted by the joint system. Mr. E. Tons in his paper entitled [" *A Theoretical Approach to the Design of a Seal for Road Joints*" (prepared for presentation at 38th Annual Meeting Highway Research Board 1/5-1/9 1959)] has further developed the studies on this subject, pointing out that the depth of the joint sealant affects the maximum strain of the sealing material and therefore should be included in the design consideration for the joint system.

All these studies refer to mechanical changes on the joint system and the resultant effect on the maximum strain exerted on the sealing compound. We realize now that the term ultimate elongation doesn't define the elastomeric properties and the performance potential of a polysulfide sealant.

How can a specification writer be sure to select the right sealant for the job? Can we depend on the ultimate elongation data of the original samples or do they change with actual aging? Would we prefer a soft set sealant over a hard set sealant?

Research and theoretical studies have compiled additional data that cast light on these mysterious performance questions. The advanced sealant technology enables us to formulate the improved engineered polysulfide sealants.

Elastomeric characteristics of improved polysulfide sealants

The original elastomeric properties of polysulfide sealants change with actual aging and exposure. The trade is familiar with the change in hardness using the conventional polysulfide sealant. It is well known that after two to three years performance the conventional polysulfide sealants increase in hardness and become brittle, stiff and lose extensibility. Hardness on the other hand represents the degree of cure and other elastomeric properties such as elastic recovery, ultimate elongation and *resilient energy*—the key to our performance potential. How do they change on actual exposure and after accelerated aging?

(Continued on page 32)

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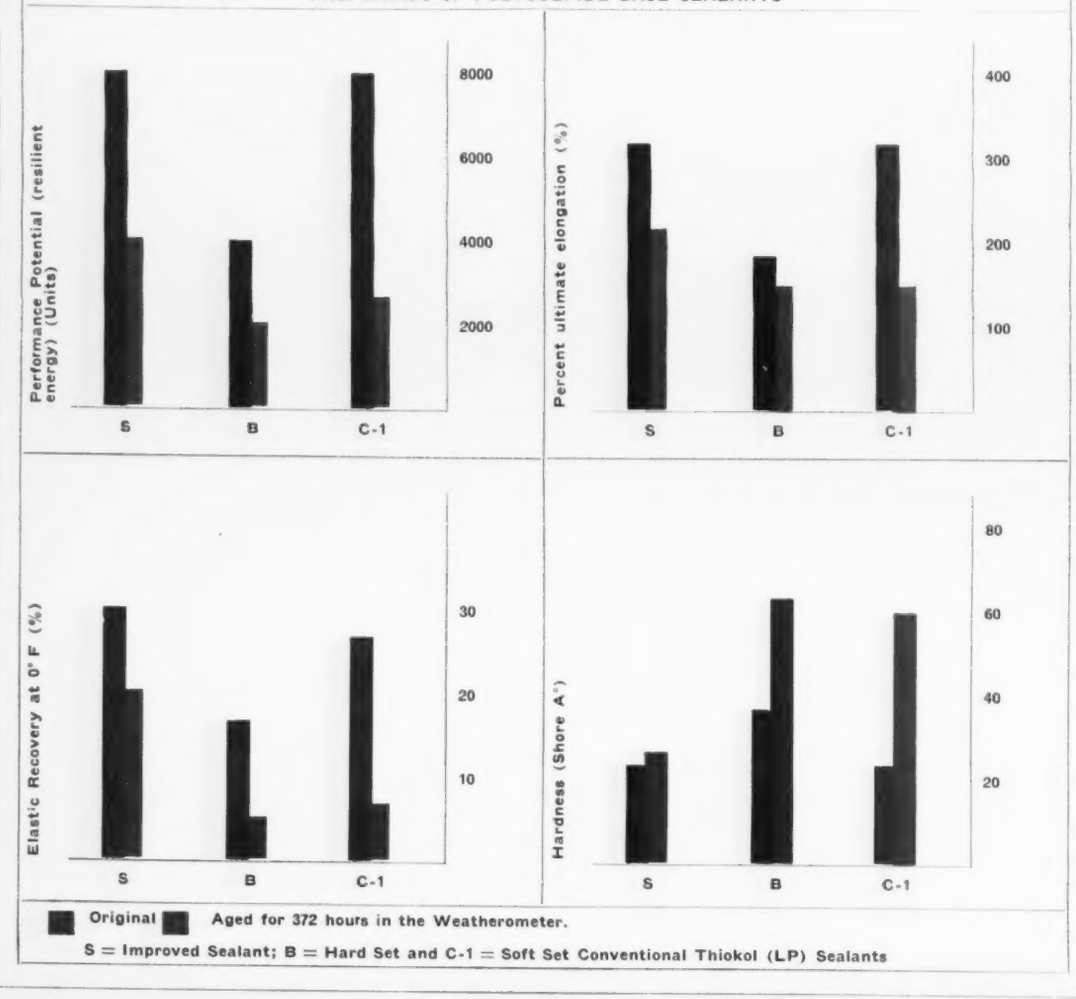
TABLE 1. ACCELERATED AGING EFFECT OF ELASTOMERIC PROPERTIES OF POLYSULPHIDE SEALANT*

PHYSO-ELASTIC PROPERTIES	CONDITION OF TEST SAMPLE	IMPROVED SEALANT SOFT SET (S)	CONVENTIONAL POLYSULPHIDE SEALANT	
			HARD SET(B)	SOFT SET(C-1)
Resilient Energy (Unit)	Original	7780	3790	7507
	** Aged	4000	1880	2705
Percent Ultimate Elongation	Original	330	180	320
	Aged	220	145	160
Elastic Recovery at 0°F (Percent)	Original	30	15	27
	Aged	20	4	6
Hardness Shore "A"	Original	25	36	26
	Aged	30	62	58

* Data compiled from "Independent Laboratory Survey of Thiokol LP Base Sealants" Conducted by the National Testing Laboratories, N.Y.C. and available from the Sonneborn Chemical & Refining Corp., 404 Park Avenue South, New York 16, N.Y.
**Samples were aged in an Atlas-Twin-Arc Weatherometer for 372 hours at an average temperature of 145°F.

GRAPH 1. ACCELERATED AGING EFFECT ON ELASTOMERIC PROPERTIES OF POLYSULFIDE BASE SEALANTS



Original Aged for 372 hours in the Weatherometer.

S = Improved Sealant; B = Hard Set and C-1 = Soft Set Conventional Thiokol (LP) Sealants

POLYSULFIDE SEALANTS

(Continued from page 31)

An extensive research project was launched employing new test methods, theoretical studies and modern evaluation methods. The results and their analysis reveal new concepts and give a clear picture as to what actually happens to polysulfide sealants on aging.

Table #1 and Graph #1 represent three test specimens from this extensive study. Sample S represents the improved formula; samples B and C-1 represent respectively a hard set and soft set sample of conventional Thiokol base sealants.

The tests have proven that an accelerated weatherometer aging period of 372 hours is very significant in establishing changes in elastomeric properties. While an exact correlation of weatherometer aging with natural aging cannot be definitely stated, our experience shows that such changes will occur in a sealant after three to seven years exposure in actual service. It is quite obvious from the results that the original values for the elastomeric properties are misleading and are drastically changed after the accelerated aging.

Hard set vs. soft set sealants

The hard set sealant starts with a Shore "A" of 36 and reaches a Shore "A" of 62. The high modulus of elasticity is reflected by a low elastic recovery at 0°F as well as a low extensibility (ultimate elongation 145 per cent) and a low performance potential (2,000 resilient energy units) after aging, as compared with 3,000 energy for the soft set sealant.

The soft set sealant has an original low modulus of elasticity that is apparent from its higher performance potential (7,780 units) and high extensibility (330 per cent elongation).

It is important to note that in the case of the conventional Thiokol base sealant the elastomeric properties of the soft and hard set, although differing considerably when freshly applied, exhibit the same physical properties, including Shore A hardness, after an accelerated aging. This proves that the soft set sealants of conventional formulations are in a meta-stable stage as far as their elastomeric properties are concerned. Furthermore it proves basically that soft and hard set sealants are formulated alike. From the practical point of view there is no sense in recommending the conventional soft set over a hard set sealant because of the reasons mentioned above.

The use of hard set sealants is recommended only for applications that involve abrasion, concentrated load, and a small change in the strain exerted on the sealant. The fact that the soft set sealant changes so drastically after 372 hours accelerated aging (which is a short time as compared to the 20 years expected service life) leaves much to be desired for this sealant. The elastic unstable conventional sealants are now giving way to the advanced improved sealant.

Improved vs. conventional polysulfide sealants

The major characteristic of the improved sealant is the fact that they are designed and formulated in a very unique way to produce a stable product. A high performance potential (4,000 units) is maintained during the aging period. The extensibility is high (220 per cent) and changes slowly. The elastic recovery at 0°F (20 per cent) is far better than any of the conventional sealants. The hardness is relatively unchanged and is retained during the aging period.

The absolute value of the final hardness after the accelerated aging period was found to be correlated with the ultimate elongation of the aged sealant. In any event, the change of the original hardness and the absolute value of the final hardness after aging determine the elastomeric characteristics of the system. The studies prove that a permanent Shore "A" of 20-40 represents the region of low modulus of elasticity and the related high performance potential. A Shore "A" value of 40-60 is a moderate to high modulus of elasticity which is typical for the conventional Thiokol sealants, soft or hard grade because of their transitional nature. Shore "A" of 60-80 represents a brittle compound with almost none of the desired elastomeric properties.

The longest service life should therefore be expected from the improved sealant exhibiting a constant Shore "A" hardness within the range of 20-40. The elastic recovery of the sealant plays an important role in the performance of the joint system because of the critical effect of exposure to winter subfreezing temperatures. Once the sealant loses its elasticity, we have an irreversible process and by the summer the brittle sealant will break the bond to the substrate and destroy the continuity of the system. The improved sealant exhibits an acceptable degree of recovery (20 per cent) at 0°F, after aging. The improved polysulfide sealant will retain adhesion and perform at temperatures down to a brittle point of −70°F.

Non staining of improved polysulfide sealants

The professional trade reported (J.R. Panek, Polysulfide Sealants for Stone", Stone Magazine, Sept. 1958) several cases of pink staining on marble and stone caused by the conventional (Thiokol LP) based sealants. Laboratory tests have proven that this phenomenon was caused by an "adhesive additive" and not by the Thiokol LP polymer itself.

This additive will react with active iron impurities present in certain masonry substrates and cause the staining. A partial solution to the problem was offered by the use of primers. The improved sealants do not contain the adhesive additives; thus they are non-staining by composition of matter. This is extremely important where sealant applications overlap primer strips on masonry, marble, or concrete.

Functional performance specification for polysulfide sealants

The professional trade is now using three available specifications.

1. Corps of Engineers Specification. Waterways Exp. Station.
2. Federal Specification SS-S-00 (Army C-E) Sept. 23, 1959.
3. The A.S.A. Specification for Sealing Compound for the Building Trade (July 27, 1960).

The American Society for Testing Materials (A.S.T.M.) has appointed a new Committee C-24 on Joint Sealants and active work is now under way to an accepted, definite, and accurate specification.

In any event a functional performance specification should define and specify the actual elastomeric requirements of the sealing compound.

The original and aged values of the resilient energy, elastic recovery, ultimate elongation, and hardness should be specified, as well as the allowed percent change after accelerated aging.

An exact definition of the required sealant for a specific job necessitates a functional, detailed performance specification embodying the elastomeric characteristics.

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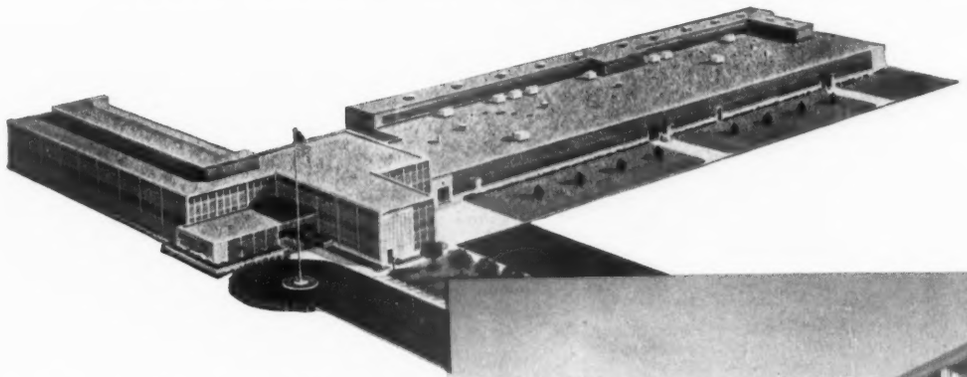

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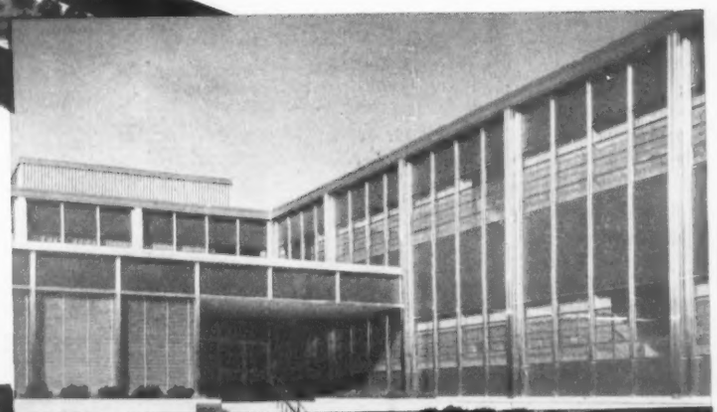

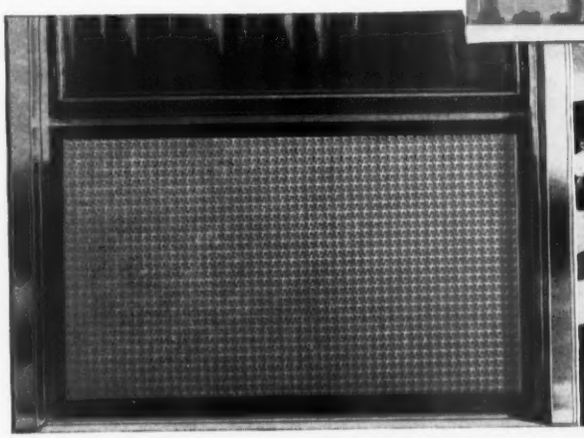

Close-up of curtain wall panel showing stainless RIGID-tex Metal, pattern 1-RL. Finish is blue porcelain enamel, highlighted to produce brilliant starlike effect.

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HEAT/WATER VAPOR TRANSMISSION CRITERIA FOR SANDWICH PANELS AND CURTAIN WALLS

Heat and water vapor transmission criteria for sandwich panels and curtain walls was the subject of a paper presented at the 1959 Fall Conference of the Building Research Institute on Sandwich Panel Design Criteria. The authors in this joint-presentation were E. R. Queer and E. R. McLaughlin of University Park, Penn. Professor Queer is a past-president of the American Society of Heating and Air-Conditioning Engineers.

Prior to World War II and in the early years of the post-war housing boom, a great deal of attention was concentrated on condensation and heat transfer problems in housing, particularly pre-fabricated structures. This was prompted by the many cases of failures that occurred in improperly protected insulated construction. These failures were indicated by the large number of paint failures that were occurring on residences across the country. New houses were built much tighter than the older ones and the confined moisture, produced within the house from living habits of the occupants, seeped insidiously into the walls. The principal difficulty was that, with the addition of insulation in the walls, and the resultant lower temperatures in the outer portions of the walls and the omission of a proper vapor barrier on the warm side of the wall, condensation developed and the water content built-up in the sheathing. Condensation often water-logged structural members causing rot and fungus growth on wood members as well as corrosion on metal members. Subsequently, water accumulated in the siding under the paint and caused paint failures in the form of blistering.

In an effort to be assured that condensation conditions would not prevail in the curtain walls and sandwich panel constructions, the designer of the panels was inclined to provide an excessive amount of weather air ventilation in the wall structure. This produced two harmful effects. First, the over-all heat transmission coefficient in many cases was raised to the point where the heat losses from the building became excessive. Second, it became difficult to make the wall sufficiently tight to prevent rain leakage into the wall and building. Fortunately, it is now possible to avoid some of these mistakes when the architect and owner team up and have the panels tested under simulated weather conditions of rain, wind and summer and winter external and internal temperatures. The extensive testing programs of curtain walls and sandwich panels in the Climatometer and in the guarded hot box for heat transmission measurements have provided a considerable amount of information about heat and water vapor characteristics of these panels.

Water leakage

First it is necessary to distinguish between weather water leakage and condensation problems resulting from water vapor transmission. There have been numerous cases recently where the weather water leakage into exterior curtain wall panels is much more of a problem than condensation. An analysis of the conditions leading to the difficulties has shown that more than ample venting is provided and although considerable pains are taken to prevent the weather water from entering the venting, if the weather openings are too large and the exposure too great, rain does enter the wall when driven by high winds. When these conditions prevail and the flashing is adequately designed and carefully installed in accordance with the architects plan and specifications, water penetration into the building can be avoided. If it is possible for the designer to make his external joints weather tight without dependence on soft caulking compounds and protect his venting system from rain entrance, then the external surface can be expected to remain reasonably weather tight.

In general, it is difficult to achieve the desired weather integrity in the majority of panel installations. Therefore, the designer should strive to make the exterior as weather tight as practicable and depend on an internal panel surface to be the weather tight surface. With this arrangement some weather water leakage may be tolerated at the joints. An internal wall drainage system must then be provided and an adequate internal flashing system must be installed. When thermal insulation is provided it may be placed outboard of the weather tight surface if it is of a type not affected by water. Otherwise, it must have a protective covering and be vented. Generally speaking, soft caulking compounds alone should not be depended upon for the sole protection against wind and weather water leakage at joints. When these precautionary arrangements are observed and considerable care is observed in the inspection, a satisfactory construction is attained.

Water vapor transmission design criteria

As previously indicated, it is important to prevent accumulation of water in sandwich type panels. In the winter time, this moisture can freeze and may destroy such materials as masonry, tile and some plastics in which it is deposited. Moisture in contact with organic materials may cause rapid deterioration from rotting and fungus growth when the temperature is high as in the summer. Lastly, the corrosive effects of moisture on certain metals can be substantial, particularly if materials of high alkalinity are in contact with unprotected metal. This is true where cracks have occurred in paint and protective coatings and damp alkaline materials have caused rapid and active crack or crevice corrosion. Such corrosion can be extremely destructive in its swift action. When water accumulates in walls by freezing, it offers a potential sudden release from thawing and in some cases is channeled back into the building around windows. Another problem to consider is the condensation of moisture and frost build-up on window frames and metal members.

In normal building construction water vapor transmission does not present a problem with interior walls or partitions unless there is a substantial vapor pressure differential across the wall and the temperatures are low on one side. When the latter conditions prevail a vapor barrier should be provided on the warm side of the wall. A good paint schedule can be sufficient. If the sandwich panel is used in floors, it is a good practice to provide a vapor barrier on the warm side of the panel if it faces a high humidity space.

In the event panels are used for roof construction much care must be observed to prevent condensation problems. Since a roof by the very nature of the construction requires that a water tight membrane be on the weather side of the structure, considerable potential difficulty may be encountered from condensation in panels used as a base for roofs. An excellent vapor barrier must be applied to the warm side of the panel and all joints must be carefully sealed against influx of moisture. When the panel serves as a ceiling and there is an air space between it and the roof, there should be weather air ventilated through the space. Usually natural ventilation through protected wall louvers and roof ventilation is sufficient to relieve any build-up of moisture. The amount of air used to ventilate roof spaces is critical. If excessive, the heat losses may become prohibitively large. Occasionally mechanical ventilation is provided through these spaces to correct condensation problems in roofs. It is advisable to consider preheating weather air used for this purpose, otherwise the potential condensation conditions may be aggravated rather than relieved by ventilation.

The FHA requirement for spaces between roofs and top floor ceilings is that there be cross ventilation for each separate space by openings protected against snow and rain entrance. The ratio of total net free ventilating area to area of the ceiling shall be not less than 1/500, except that the ratio may be 1/300 provided:

(a) A vapor barrier having a transmission rate not exceeding 1 perm and installed on the warm side of the ceiling; or

(b) At least 50 per cent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated (at least 3 feet above the cornice or wall vents) with the balance of the required ventilation provided by cornice or wall vents.

Basementless spaces require four foundation wall ventilators, one located at each corner and having an aggregate net free ventilating area not less than 1/150 of the area of the space. When the ground surface is treated with a vapor barrier, two foundation wall ventilators having an aggregate net free area of 1/1,500 of the space area is sufficient. In all cases, these exterior openings should be screened with 8 mesh per inch screening to exclude insects.

The openings required to provide ventilation for exterior wall sandwich panels to prevent condensation and accumulation of water has not been so clearly defined as the rules set forth above. It may be necessary to provide an air wash in exterior walls where spandrels and metal supports are used. In the event the water vapor transmission rate of the warm side of the panel in the winter is 5 perms, there should be 1 square inch of free area per lineal foot of panel at both the top and bottom of the panel. The area in square inches at top and bottom should be proportional to the reciprocal of the WVT rate in perms. However, the minimum ventilation area should not be below that for a transmission rate of 1 perm or 0.20 square inches at the top and bottom of the panel. Occasionally, atmospheric polution and dirt or frost will foul up the openings and water drainage system. Therefore, the minimum dimension of the vent openings

should not be less than 0.25 inch to prevent clogging from dirt or frost. When the openings are within 50 feet of the ground level they should be protected with 8 mesh screen.

In sandwich panels, as in other types of construction, the interior surface should not transmit more than one fifth as much water vapor as the exterior surface. In other words, the interior surface should have a vapor barrier five times as good as the exterior so as to permit the release of moisture to the atmosphere.

Heat transfer design criteria

The heat transfer values can vary widely in sandwich type panels. Often times the designer puts forth a great deal of effort to attain a well insulated wall only to find that structural members for holding the panels in place on the wall and metal edges on the panel by-pass a large portion of the thermal resistance of the insulation. Ordinarily, the heat transfer values of panels required for internal walls are not of the same importance as exterior walls because the temperature differences between spaces is of a lower magnitude than for exterior walls. Thermal insulation is not needed in internal wall panels but it is often used for acoustical treatment. Ceiling and floor panels may approach the wall panel temperature differences if there is weather air ventilation in the spaces they face such as between a suspended ceiling panel and the roof or basementless spaces.

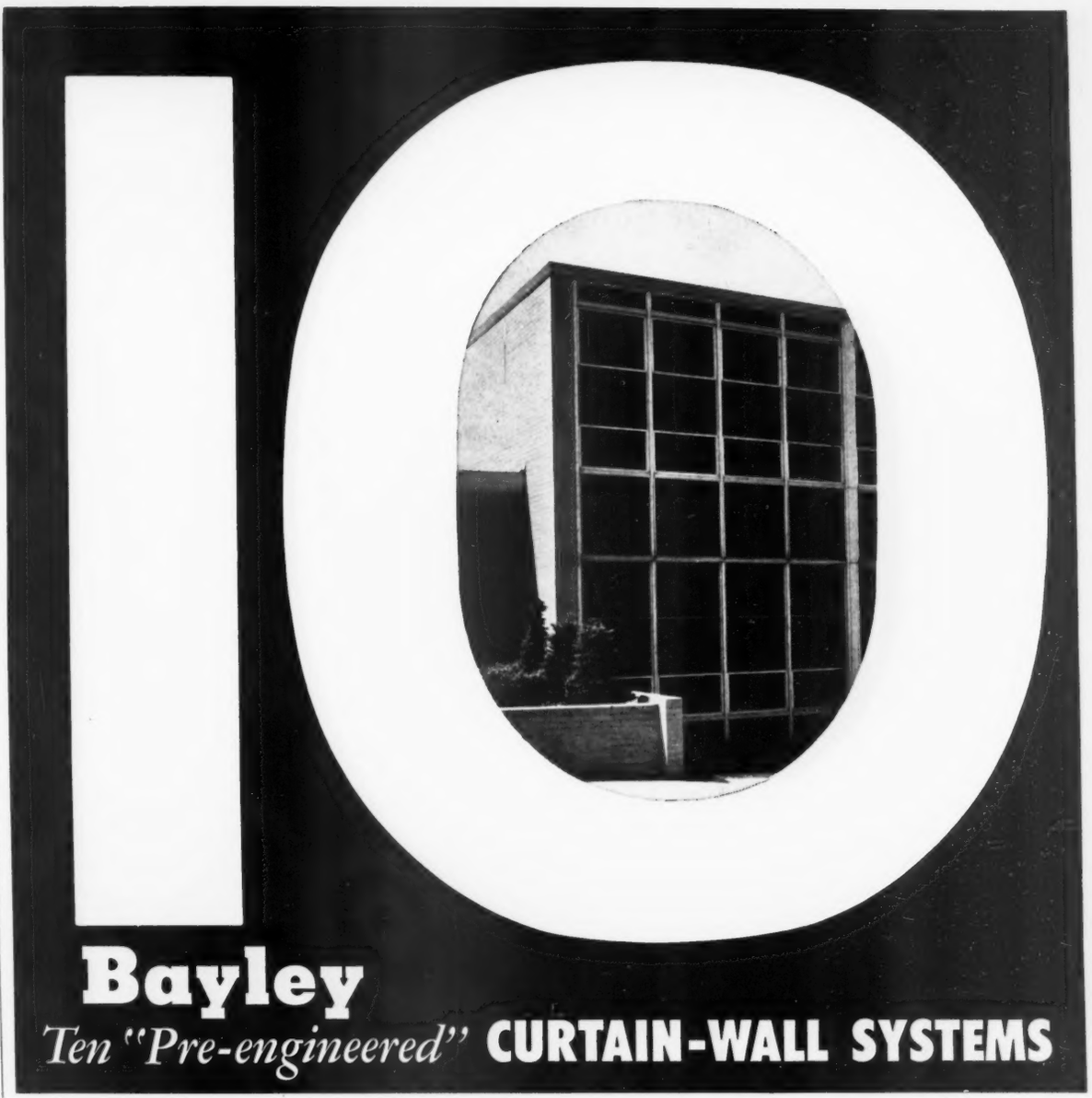
The heat transfer coefficients that have been measured on sandwich panels may be on the high side in comparison to conventional construction. They have ranged from a few at U=0.08 to the majority at higher values such as 0.06; whereas insulated conventional constructions range from U=0.08 to 0.15. (Transmittance U in Btu/sq ft/°F temperature difference inside to outdoors.) Glass panels have U values of 1.13 for ¼" plate, 0.55 for double window arrangements and 0.36 for triple windows for ½" glass spacing. Where large window areas are incorporated with panels to form the exterior of the building the heat transfer coefficient for the panel walls can match the glass coefficients without causing excessive fuel costs for the panels.

Although it is difficult to completely insulate the composite wall made up of sandwich panels, an effort should be made to do so. Metal hangers and supports for holding the panels cause cold spots and these do develop condensation or frost over these areas. Furthermore, cold areas on a wall will contribute to the discomfort of the occupants of the building sitting in the vicinity of these areas. The radiant heat transfer and cold down drafts along the wall are the principal causes of the discomfort. Excessive heat transfer along the exterior floor edges is occasionally the source of cold feet and discomfort. Attention must be given in the design to these factors in order to avoid complaints from the occupants.

Testing and mock-up

Owing to the fact that most thermal insulations lack sufficient structural strength to withstand structural loadings and tensile strength requirements, rarely can they be placed in series with the heat transfer paths of through metal members. These devious paths of high thermal conductivity metals develop a complex transmission system for which it is virtually impossible to calculate the heat transfer coefficients. Therefore, when the heat transmission coefficients must be evaluated, they should be

(Continued on page 36)



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HEAT/WATER TRANSMISSION

(Continued from page 35)

determined in a guarded hot box. An added advantage of the measurements of coefficients is that thermocouples can be placed over the face of the installed panel to show cold areas and corrective action often taken prior to installation. Mock-ups in controlled climate rooms give much valuable information and permit the designer to correct mistakes before installation is made.

Inspection

Although this paper deals with design criteria, it is considered important to stress the fact that buildings containing sandwich panels and curtain walls require a great deal more precision in construction than do conventional buildings. Flashings for exterior walls must be carefully designed and installed because in the coastal areas buildings are exposed to hurricane wind velocities of 100 mph with rain. Weather water leakage becomes a very real problem under conditions where water columns of 6 inches can be supported by the wind. Therefore, the need for good design and careful inspection during construction is most urgent. In conventional construction these problems do not appear so acutely because the masonry usually absorbs and holds the water. The sandwich panel is lighter and thinner, and it does not have capacity to hold the water. As a result leakages, wherein the design is inadequate, and the installation is poor, are more evident.

Soft caulking compounds and joint sealants should not be depended upon solely to correct the deficiencies. These compounds do not have the permeance that is expected of the other materials to last for the life of the building and need frequent replacement. Maintenance costs can be troublesome if proper attention is not given to the design and installation of flashing, drainage systems and joints.

Summary

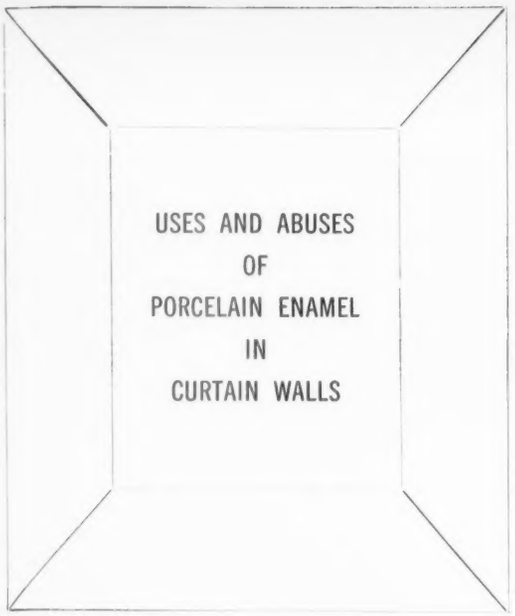
(1) Condensation and heat transfer problems can be very real in sandwich panel and curtain wall construction. However, in an effort to avoid them special care must be observed to avoid more serious problems such as weather water leakage and cold spots on the walls.

(2) In sandwich panels as in all other types of construction it is important to have the best vapor barrier attainable on the warm side of the wall in the winter. Then, the exterior surface of the panel should be capable of transmitting five times as much vapor as the interior surface. Limited ventilation can be used in many cases to avoid condensation problems but care must be used so that it is not excessive, otherwise the heat transfer values for the wall may be increased.

(3) In sandwich panels it is generally easier to obtain good thermal resistance than with curtain walls. However, care must be observed to avoid destroying the insulation with metal edges and possibly the method of attachment to the building.

(4) Much can be learned about the performance of the panels from heat transmission tests as well as mock-up arrangements in chambers that reproduce winter climates along with wind and rain conditions.

(5) Owing to the fact that a greater degree of precision is required in buildings with sandwich panels and curtain walls, it is important that the inspection be executed much more carefully than in conventional buildings. Flashings must be carefully designed and installed in accordance with the design and specifications.



A provocative point of view on the uses and abuses of porcelain enamel in curtain wall panels is given by a leading manufacturer. The author, Herbert R. Spencer, Jr., is president of the Erie Enameling Company, Erie, Pa.

Architectural critics have protested against what they claim is the lack of imagination and ingenuity in many of today's monotonous curtain wall installations.

Who's at fault?

Is it the panel manufacturer, who is often so squeezed by price shoppers and the competitive market that he can't set aside sufficient funds for research and development, or sensible conferences with architects on the proper use of his material?

Is it the contractor, who is equally squeezed, but who often tries to get out of it by forcing substitute after substitute down the hapless architect's throat, thus emasculating the specifications?

Or is it the architect himself, who by his professional nature, cannot take advice from anyone (no matter how well qualified) and who is often unable or unwilling to stick by his original choice of material and sources, and thus, often becomes a pawn in the hands of the contractor?

Actually, all—the panel manufacturer, the contractor and the architect—are responsible in varying degrees.

But since this is an architectural magazine, let us discuss the architect's role relative to the uses and abuses of curtain walls, with particular attention to porcelain enameled panels.

First—the basic uses!

Architects will certainly agree that porcelain enameled panels are a proven building material that provide him with these three advantages:

1. Wide flexibility of design.
2. Almost unlimited range of permanent colors.
3. Effective economy in erection and maintenance.

Architects will also agree, I am sure, that the advantages of porcelain enameled panels will increase as competent manufacturers with experience and research behind them develop new panel colors, textures, cores, fastenings and other variations which expand the design possibilities of the material.

So much for the uses. Now—what about the abuses?

If it is true that buildings with curtain walls are monotonous in design, the reason undoubtedly is because architects do not recognize the available possibilities of such products and also conceivably are unwilling to capitalize on their own imagination. Thus, inadequate knowledge and lack of imagination combine to produce monotony. Certainly the manufacturers of porcelain enameled curtain wall panels cannot originate new developments in this product without the guidance of an architect, and unless new ideas are tried, monotony is inevitable.

All too often, the specifications prepared by an architect are inaccurate and out of date. Architects could avoid this by learning to rely on specific manufacturers and their salesmen for the latest information on advancements in the field. If a customer, for example, says he wants a special effect and the "artist" in the architect wants to provide it, then the architect should work cooperatively with a reputable manufacturer to develop the special effect, instead of just writing elaborate specifications which are generally a pastiche drawn from his files, and which carefully refrain from naming the few manufacturers really qualified to do the job in question.

Architects can make new and intriguing uses of porcelain enameled curtain wall panels if they are willing to work with the major producers, who have quite a reservoir of research and development talent as evidenced by the many new achievements in this field. Here are a few examples, presented to illustrate that curtain wall panels need not be monotonous nor unimaginative.

Porcelain enameled panels are new being made with a variety of special effects, one of which is illustrated by the Lee National Life Insurance building in Shreveport, Louisiana. This installation has panels that appear to be embossed with a pattern of squares. Actually, we gave the architects (Neild, Somdal Associates) that effect through our silk-screening a second coat of light blue-gray porcelain enamel over darker blue porcelain enamel panels, and refiring the panels to fuse both colors permanently. This resulted in spandrel panels which appear to be embossed. Yet the cost were negligible compared to the die and labor costs involved in embossing.

Another example of this technique consists of simulating ceramic tile in porcelain enameled panels. Actual ceramic tile adds considerable "dead weight" to a building; in addition, the great number of joints allow potential water infiltration, causing individual tiles to "pop" in freezing weather. However, silk-screening on porcelain enameled steel can give the same effect as tile, complete with grout and shadow lines, and eliminate the weight and "popping" problems.

Chain and link patterns for frieze and fascia can also be silk-screened and thus relieve the monotony of large plain panels. Hugh mural panels, both exterior and interior, are also possible and practical in this medium. The recently completed Warren Area Junior-Senior High School, Warren, Pa., is a typical example.

The design by architects Meyers, Krider, Wehrle and Ellenberger features large colorful murals of figures denoting typical student activities. These murals are 12 feet high in six colors. The net result is a dramatic and imaginative new treatment for porcelain enameled curtain wall panels.

Colors themselves can be used in a variety of ways with porcelain enameled panels. Qualified manufacturers of porcelain enamel panels can now offer as many as 1,300 variations of colors in matte, semi-matte, satin and stipple finishes.

Semi-matte colors are recommended for all large panels and all projects whose brilliance is to be reduced to a sheen. Satin finishes should be used for brightness, accent or greater reflectivity. But remember that satin's higher gloss tends to emphasize any variation in the surface plane, so on very large panels it should be used with caution, if at all.

Stipple finishes in satin create a sparkle effect, and in semi-matte, a depth pattern. In multi-colors, a tonal effect can be obtained to aid in blending with other materials used on the job.

Another example of developments that have led to the variety of porcelain enameled curtain wall panels that are actually available today is the range of materials and assembly choices provided by manufacturers. In addition to mechanically assembled panels using steel, stainless steel and aluminum for face and backs with a choice of six or seven different core materials, laminated panels with skin materials bonded to a rigid insulating core are becoming popular. Adhesives have now been developed to the point where a variety of nine or ten core materials may be securely bonded to steel, stainless steel or aluminum and thus provide panels that are flat, light in weight and easy to assemble.

Still another example of the imaginative use of porcelain enameled curtain wall panels is a residential experimental application in Cleveland, Ohio. The Ferro Research House, as it is called, has a modular, unitized design for fast erection. Borrowing from experience gained in the construction of schools, commercial and industrial building, steel was selected as the prime material. To provide enduring beauty with minimum maintenance costs, porcelain enamel has been used extensively in the building. You'll find it on the roof, on both sides of exterior walls and doors, in the bathrooms, kitchen, and many other areas of the home.

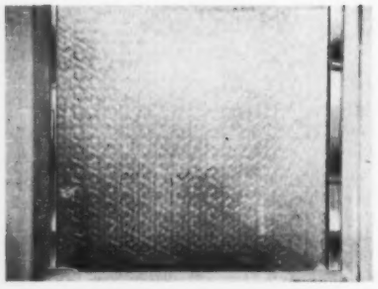
But other materials are used, too . . . where they fit into the concept of "unitized" construction and perform their functions effectively with a minimum of care and upkeep. The actual selection of materials was made by the architects and "creators" of the house, Carl Koch & Associates, established exponents of mass-produced housing.

The Ferro Research House, therefore, is attractively "wrapped" in porcelain-enameled steel "curtain wall" panels and steel roof deck, the latter insulated with 4 inches of fiber glass. All elements of the structural "envelope" conform to the modular, or unitized, principle in building.

My purpose in presenting these examples is to illustrate the variety already achieved with porcelain enameled curtain wall panels, in the hope that more architects will realize that the aim of the manufacturer is to help him do a better job in designing with this material, and of realizing more of its eventual potential. I also hope that this will help to break down the unnecessary barrier to communication between architect and manufacturer. The abuses of curtain wall panels can best be minimized through mutual efforts to develop better methods and materials. In this way, the curtain wall need never again be "monotonous."

PRODUCTS, EQUIPMENT, MATERIALS

Report of recent developments by industry, based on data furnished by mfrs. Inquiry cards for further information face pages 1 and 86.



DISAPPEARING TUB ENCLOSURE

MFR'S DESCRIPTION: shower unit that rolls up out of sight like window shade when not in use, leaving only two fittings of polished aluminum at tub ends.

USES: residential, hotel, hospitals, etc.

SPECS/FEATURES: *Rola-Dri's* flexible, translucent screen gives full protection against spray, splash, and drip while adding important safety factor to bathroom, since it has no glass or plastic to crack or shatter. When not in use, unit slides back into spring-loaded container. There is no track on tub rim to collect dirt and design makes all parts of tub easily accessible for cleaning, mfr states. Available for less than $20.00.

AIA FILE NO. 29-H-3

MFR: OASIS CORP.

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CROSS-CORRUGATED TRANSLUCENT PANELING

MFR'S DESCRIPTION: continuous, cross-corrugated, translucent fiberglass paneling in roll form.

USES: long industrial skylights, sidelights, awnings, signs, greenhouses, fences, etc.

SPECS/FEATURES: *Rololite* can be rolled on and attached in fraction of time required for longitudinally corrugated panels which must be installed individually and overlapped. Material can be cut, sawed, nailed or drilled with common hand tools. It is shatter-proof, weather-resistant, and impervious to corrosion, mfr states. *Rololite* will be stocked in 50′ rolls, 40″ wide, and in 2½″ x 9/16″ corrugation, with crinkle finish on both sides. It will be available in two weights: five ounces per square foot and eight ounces per square foot, and in seven colors: snow, clear, yellow, canary, beige, tangerine, and nile green. Mfr stresses substantial labor and cost savings made possible for fabricators of steel bulidings.

AIA FILE NO. 26-A-9

MFR: FILON PLASTICS CORP.

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LINE OF OFFICE BUSINESS CHAIRS

MFR'S DESCRIPTION: designed by Donald Deskey, *The Contoura Group* is family of seven moderately priced, contemporary-styled, business chairs.

USES: offices.

SPECS/FEATURES: included in group are two executive swivel chairs, each with matching executive side arm guest chair; clerical chair; stenographer chair; and armless side chair. Executive adjustable swivel chairs can be individually adjusted in four separate ways to conform to size, contour, posture, and seating habits of any person working in any office situation, mfr states.

AIA FILE NO. 28-A

MFR: CORRY JAMESTOWN CORP.

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ADDITION TO HOSPITAL CASEWORK SYSTEM

MFR'S DESCRIPTION: *Medi-Serv* units provide complete storage and equipment need for efficient medicine preparation in nursing units.

USES: hospitals.

SPECS/FEATURES: units are custom designed for each hospital to provide type and quantity of storage and equipment in keeping with their medicine and dispensing practices and needs. Single-unit construction simplifies installation in new buildings or nurses' stations currently in use. Unit may be recessed in wall or used as free-standing section. Specialized storage may include: locked narcotics compartment, refrigerated compartment, open or concealed shelving for medicines or sterile supplies, medicine cup dispenser, glide-out waste receptacle, 24 hour medicine card rack, step shelves of various heights, storage for cleaning supplies, Conveniences include: stainless steel counter with stainless steel tiered

backsplash and end splashes, stainless steel medicine sink formed as integral part of counter without crevices or ridges, recessed fluorescent lights, complete medicine preparation facilities in minimum space, and versatility in design and color.

AIA FILE NO. 35-K

MFR: ST. CHARLES MANUFACTURING CO.

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HVAC

ADDITION TO WATERTOWER LINE

MFR'S DESCRIPTION: *Series 15 Double-Flow Aquatower* bridges capacity gap between standard line and unlimited capacity industrial cooling towers.

USES: major air-conditioning and industrial process cooling applications.

SPECS/FEATURES: *Series 15* design is said to combine many features of both *Double-Flow Aquatowers* and mfr's industrial cross-flow towers. Included in *Series 15* design from industrial towers are: sloping louver walls and broad louvers, glass reinforced polyester filling supports for permanent alignment and positioning of splash bars. From the basic *Double-Flow* design, *Series 15* utilizes open gravity water distribution system, minimum height in relation to capacity, low pumping head, safe inspection and maintenance. Standard equipment also includes: combined mechanical equipment support and hot water lateral, flow control valves and external lube lines on gear drives. Water distribution arrangement permits several piping options including concealed internal piping and either sidewall or endwall risers. Advanced structural arrangement is said to effect appreciable reduction in erection costs.

AIA FILE NO. 30-F-3

MFR: THE MARLEY CO.

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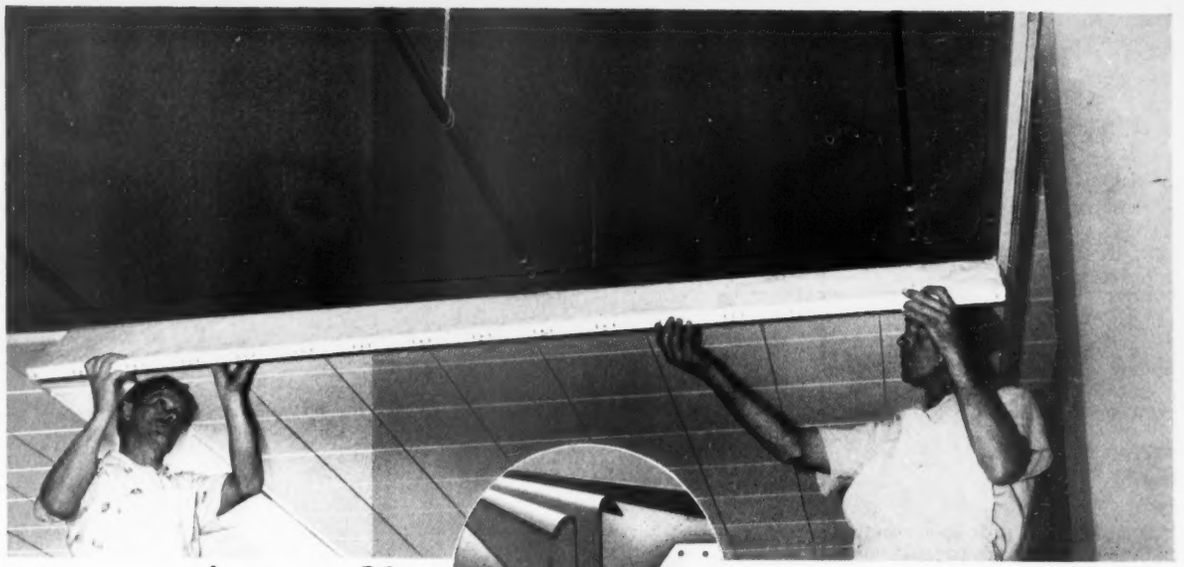
LIFT FITTINGS FOR VACUUM SYSTEMS

MFR'S DESCRIPTION: series of lift fittings for use with vacuum systems of steam heating.

USES: where condensation is to be lifted to higher level.

SPECS/FEATURES: series *M24* units are made of single casting of close-grained gray iron, thick-walled and accurately finished to low-pressure standard. Fittings range from ¾" to 4" in size. Sizes from ¾" to 2" have screwed connections for both inlet and outlet. Sizes from 2½" to 4" have flanged inlet and screwed outlet. Companion flanges and bolts are provided as standard equipment. All sizes are provided with clean-out plug



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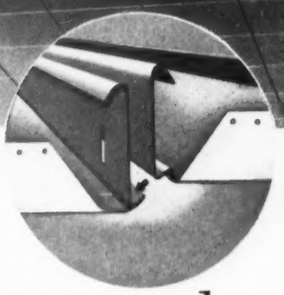
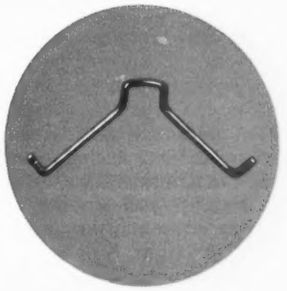


. . . and a clip



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Circle 116 for further information

so that dirt and foreign matter may be removed.
AIA FILE NO. 29-B-1
MFR: MODINE MANUFACTURING CO.
Circle 205 for further information

POWER ROOF VENTILATORS

MFR'S DESCRIPTION: line of power roof ventilators with choice of three interchangeable discharges; standard straight-through, decorative straight-through, and mushroom.
USES: industrial ventilation.
SPECS/FEATURES: low silhouettes and styling are complemented by color scheme; discharges are painted special blue for unobtrusiveness against sky, while bases are neutral sand-gray. Other features include combination of magnetic damper lock, damper design, and rubber seal which makes units chatter and leak proof, and light tight. Nylon damper bearings assure quiet service and long life, mfr states. Fans have aerodynamically-designed blades and are dynamically balanced. Motors are direct-connected to fanshaft. Discharge sections are hinge-connected to fan housing for convenient, safe accessibility. Ten fan and 12 motor sizes cover capacity range from 600 cfm to 51,000 cfm. Construction is all-welded, heavy-gage steel with aluminum dampers as standard, and aluminum or stainless steel construction optional. Options include fusible link attachments for automatic fire ventilation, special protective coatings for corrosive atmospheres, and breather casings to isolate motors from contaminated exhaust air.
AIA FILE NO. 30-D-1
MFR: L. J. WING MANUFACTURING CO.
Circle 206 for further information

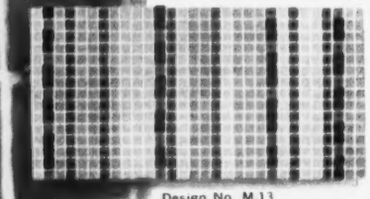
CONTROL VALVES FOR STEAM SYSTEMS

MFR'S DESCRIPTION: time control for high-pressure steam system to extend life of motorized valves and eliminate radiator knocks and bumps.
USES: high-pressure steam systems.
SPECS/FEATURES: called *1977SKV1*, unit pulses open motorized valves to permit gradual entry of steam. Use of control, which opens valves at one pulse per minute, saves cost of

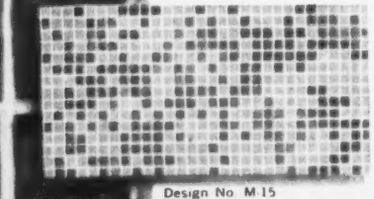
Circle 117 for further information→

Have you discovered
the wonderful decorative possibilities of

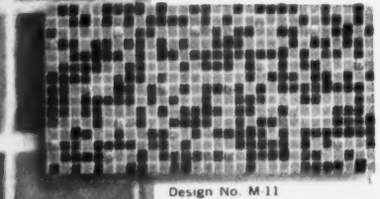
HORIZON



Design No. M-13

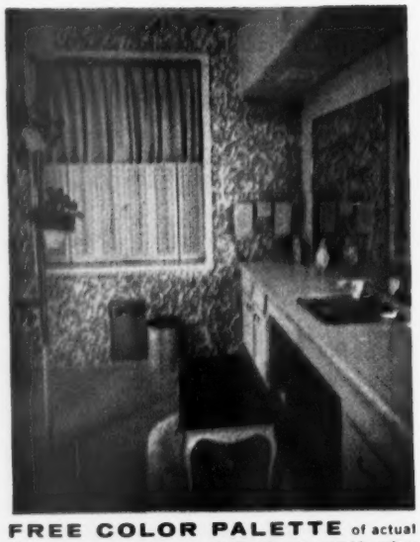


Design No. M-15



Design No. M-11

Design No. M-5
Actual size tiles

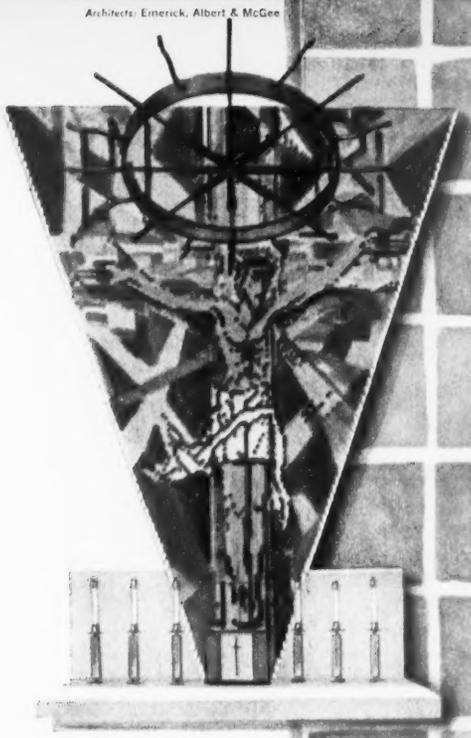


FREE COLOR PALETTE of actual tiles showing complete range of 58 different available colors will be sent without cost to architects and designers who write on their professional letterhead to Dept. AE-60-10

Architects: Emerick, Albert & McGee

TILE

...*the new*
glazed ceramic mosaic
produced in the U.S.A.
by Suntile



The Crucifixion—
an 11'x15' mosaic mural
St. Andrew's Church
Columbus, Ohio
Muralist: Charles L. Madden
Resurgere Associates,
Phila., Pa.

Here's a sure-fire way of giving your interior wall designs an interesting fresh appearance . . . *Design them with* HORIZON TILE. This new, colorful wall tile has an informal, handcrafted appearance that's beautiful beyond description.

HORIZON TILE achieves its distinctive appearance through the intentional variation and irregularity of its shape, its surface texture and its 58 beautiful color shades that range from soft pastels to solid or textured tones.

Whether you use HORIZON TILE to create a beautiful mosaic mural, like the one shown here, or use one of the many interesting "Buckshot" or "Striped Pattern" designs created by Suntile's Design Department, you'll find that HORIZON TILE adds greatly to the beauty of your finished wall.

HORIZON TILE, made in America by Cambridge, is available through your local Suntile dealer. His name is listed in the Yellow Pages of your telephone directory.

OUR DESIGN DEPT.

under the direction of George Limke is ready to assist you with your tile design or layout problems. Send us your plans or elevations for suggested tile applications, or let us put your own tile designs in layout form.

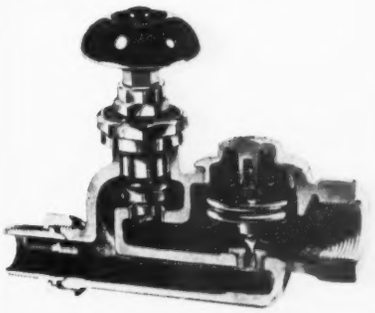
THE CAMBRIDGE TILE MFG. CO.

P.O. Box 71, Cincinnati 15, Ohio

Design No. M-2
Actual size tiles

PRODUCTS, EQUIPMENT, MATERIALS

modulating motor valves, mfr states. Control is double-pole, double-throw switch, available with *Skip-A-Day* control. This permits omission of operation on one or more days each week without altering master program. Housed in versatile *Quick-Out* case, mfr claims time switch is quickly and easily installed.
AIA FILE NO. 31-N
MFR: TORK TIME CONTROLS, INC.
Circle 207 for further information



DOUBLE SERVICE VALVES FOR STEAM HEATING

MFR'S DESCRIPTION: double service valve for steam heating systems that uses thermostatic trap and radiator supply valve in single, compact unit.
USES: one-story buildings and basements when it is desired to run steam supply main along ceiling with down-feed risers to radiators.
SPECS/FEATURES: valve serves as both supply valve for radiator and drip trap for down-feed riser, replacing two separate units. Thermostatic trap member automatically discharges water and air from down-feed riser through by-pass in valve body into radiator and then into return main. In presence of steam, thermostatic member closes, preventing waste of steam. Down-feed riser, which serves as drain for overhead main, is kept free of water. Steam is admitted to radiator by valve member which is quick-opening, non-modulating type, using spring-retained packing ring.
AIA FILE NO. 29-B-4
MFR: MODINE MANUFACTURING CO.
Circle 208 for further information

LINE OF AXIAL FLOW BLOWERS

MFR'S DESCRIPTION: complete line of axial flow blowers.
USES: heating, ventilating, and air conditioning industries.
SPECS/FEATURES: extensive range of sizes handle from 1,000 C.F.M. to

←Circle 117 for further information

DRAFTING TRENDS

In a typical application of the POST Diazo Materials Selector Chart, a draftsman, supervisor and reproduction specialist solve a special print-making problem in short order.

Solve unusual reproduction problems with new Diazo Selector Chart

Keeping up with rapid developments in graphic reproduction and communication techniques is a difficult job these days, even for the experts.

From the engineer's and draftsman's point of view, it's largely a matter of sorting out the specific information which helps him do a better job.

The new POST Diazo Materials Selector Chart does just that—provides a condensed, tabular reference piece that helps you anticipate the ideal diazotype prints for various needs before they occur. This convenient chart gives brief information on sensitized papers, intermediates and specialties in terse "what, when, why and where" style.

If you're concerned, for instance, with print distribution to different departments, units or groups, then prints on a variety of colored stocks might be the answer.

Increasing print production from diazo equipment with a lower-power light source . . . making legible prints from worn old tracings . . . even making copies from an opaque print . . . all can be handled by use of new POST 206M-14, a fast, extra-sensitive whiteprint paper.

Suppose a design conference calls for a poster, actual size, made from a large engineering drawing, rigid enough for display, tough enough for extreme handling and on-the-spot sketches? POST diazo-sensitized cardstock in 32 or 50 lb. weight can turn the trick on standard reproduction equipment, ammonia process or semi-moist. For many more helpful solutions to similar situations, ask for your personal file-size copy, of the POST Selector Chart, available from your POST dealer or Frederick Post Company, 3654 North Avondale Avenue, Chicago 18, Illinois.

POST

SENSITIZED PAPERS & CLOTHS • TRACING & DRAWING MEDIUMS • DRAWING INSTRUMENTS & SLIDE RULES
ENGINEERING EQUIPMENT & DRAFTING SUPPLIES • FIELD EQUIPMENT & DRAFTING FURNITURE

Circle 118 for further information

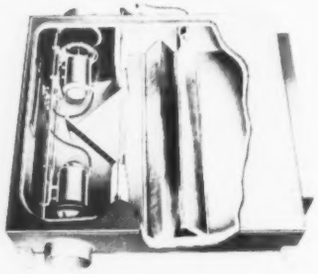
PRODUCTS, EQUIPMENT, MATERIALS

over 500,000 C.F.M. with pressures from atmospheric to ten inches of water static pressure with single stage units. Range of sizes is up to 12″ diameter in fixed blade design and from 14″ to 120″ in patented blade retention designs. Standard hub diameters available, which use this patented feature, are in various sizes from 14″ to 40″. Engineered drives which are available for this equipment include belt, coupling or direct drive.

AIA FILE NO. 30-D-1

MFR: BENSON MANUFACTURING CO.

Circle 209 for further information



ACOUSTIC TERMINAL CONTROL UNITS

MFR'S DESCRIPTION: acoustic terminal control units for all-air high-velocity systems.

USES: mechanical ventilating.

SPECS/FEATURES: available in three ceiling models and two window/perimeter models. Ceiling models come in six sizes and window/perimeter models in three sizes. Ceiling units can be had in end-discharge, bottom discharge, and multi-discharge types, Window/perimeter models, of front discharge and top discharge design, are provided with either *Curtainaire*, *Linear*, or *Modular* diffusers. All models offer option of single or dual duct, with full control section. Units are designed to solve service problems by eliminating curtains, linkages, flappers, pulleys, sliding bases, bladders, cables, pivots, perforated follow-through plates, and split responsibility in servicing units. It is claimed that systems perform all of following functions: (a) reduce high velocities and pressures for discharge of air at conventional low velocity values; (b) proportion hot and cold flows in response to room thermostat; (c) mix hot and cold flows to provide uniform temperature at discharge; (d) attenuate self-generated noise and duct air-borne noise; (e) automatically control volume of air discharge despite static pressure unbalance (or provide manual volume control. Construction features include: full acoustic baffling, inch-thick acoustic lining; metal-protected lining edges; unobstructed flow path; positive mixing with integral blender; stable pressure-drop sensing tips; non-stick resilient valve seats; leakproof casings.

AIA FILE NO. 30-D-4

MFR: CARNES CORP.

Circle 210 for further information

APPLIANCES

LOW-PRICED DUCTLESS HOOD

MFR'S DESCRIPTION: model *BD-10* ductless hood purifies air by recirculation through activated charcoal method.

USES: residential applications.

SPECS/FEATURES: vertically mounted Redmond motor activates Torrington "J" fan which pulls air through aluminum mesh filter to stop grease, and activated charcoal filter to absorb smoke, odors and dust. Available in 30″, 36″, and 42″ widths. Standard finishes are coppertone and silvertone, though other colors are supplied on quantity orders.

AIA FILE NO. 35-C-11

MFR: DUCTLESS HOOD CO., INC.

Circle 211 for further information

BUILT-IN IRONING BOARD AND MIRROR-DOOR CABINET

MFR'S DESCRIPTION: *Step-Save* is self-contained permanent fixture, prewired, self-fused, and engineered for any kind of wall construction.

USES: houses and apartments.

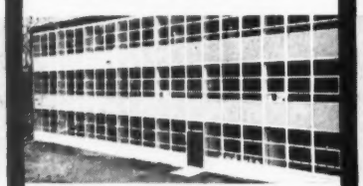
SPECS/FEATURES: cabinet, ironing board, and sleeve board are all steel. Mirrored door opens on piano hinge and swings down. Storage space is provided for iron and also holder that keeps iron off board entirely during rest or interruption. Electric timer shuts off all electricity at predetermined interval of no more than one

Circle 120 for further information about DARLINGTON BRICK pp 44-45 →

CAREY ASBESTOS-CEMENT
the versatile, low-cost curtain-wall panel

CAREY THERMO-BORD INSULATED SANDWICH PANELS FOR WINDOW-WALL CONSTRUCTION

• can be used with practically all types of window-wall designs • ideal for schools, office buildings, commercial and industrial construction • high insulation value • deadens sound transmission through walls • comes in natural gray finish, but will take various color surface treatments if desired.



CAREYSTONE CORRUGATED WALL CONSTRUCTION

• can be installed with overlap joints or with battens • needs no preservative surface treatment but can be painted any color • does not require heavy framing or foundations • ideal for simple structures where insulation is not required • resistant to practically all atmospheric conditions existing in industrial areas.

CAREY THERMO-WALL CONSTRUCTION COMBINING THERMO-BORD PANELS AND 4.2 CAREYSTONE CORRUGATED

• combines exterior and interior wall surfaces all in one • has high insulating efficiency • is quickly erected, requires no finishing, no exposed metal joint strips • can be used on all types of industrial and commercial buildings.

Carey asbestos-cement curtain-wall panels are economical, easy and fast to install, and they are virtually maintenance-free. Write **Dept. AE-1060** for your free architectural, engineering and data manuals on the uses of 4.2 Careystone Corrugated and Carey Thermo-bord in curtain-wall and window-wall construction.

THE PHILIP CAREY MFG. COMPANY
CINCINNATI 15, OHIO

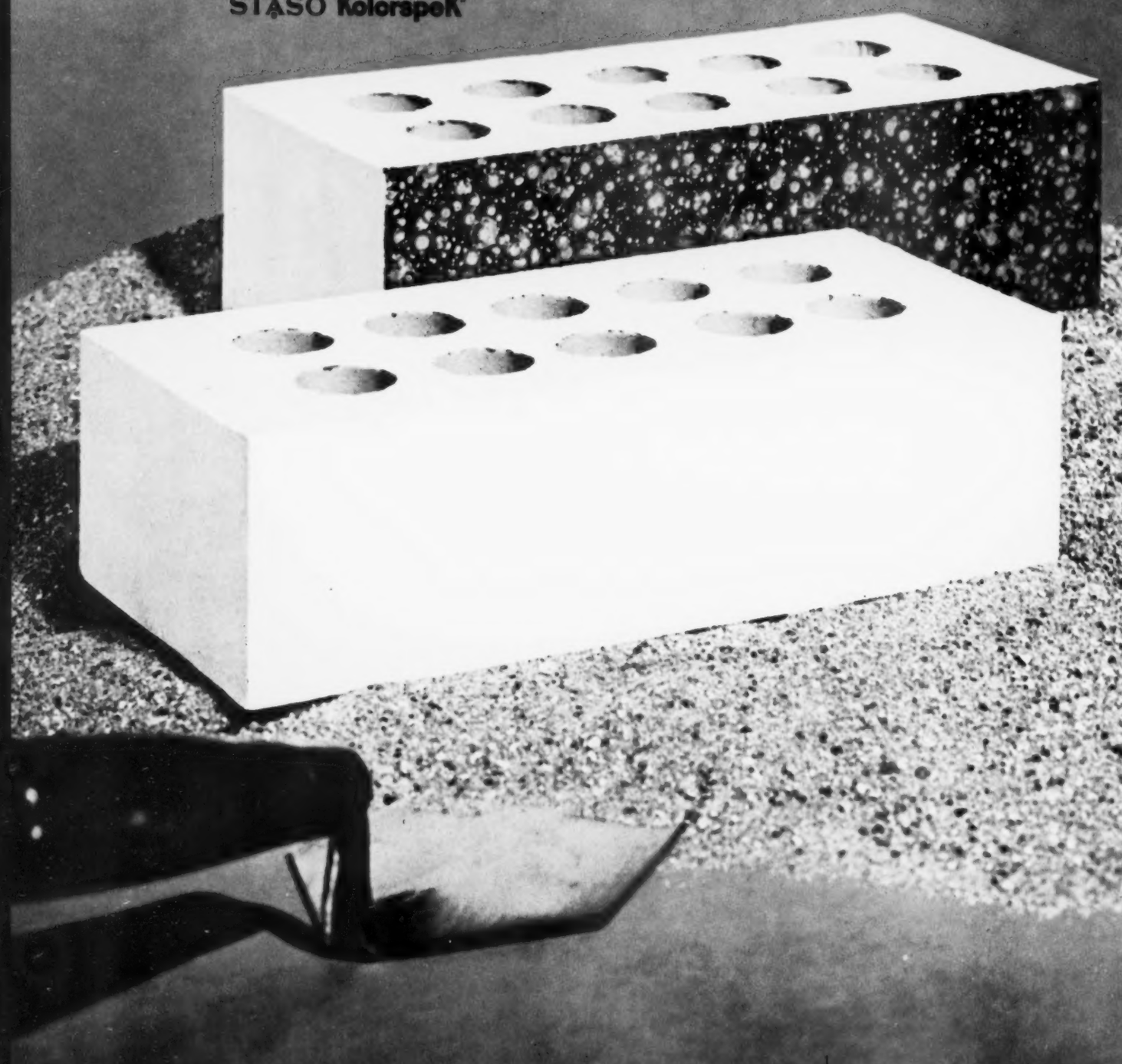
Carey

Circle 119 for further information

Think in COLOR

DARLINGTON STASO GLAZED BRICK

STASO KolorspeK®



CENTRAL COMMERCIAL COMPANY (Est. 1894)

332 South Michigan Avenue
Chicago 4, Illinois

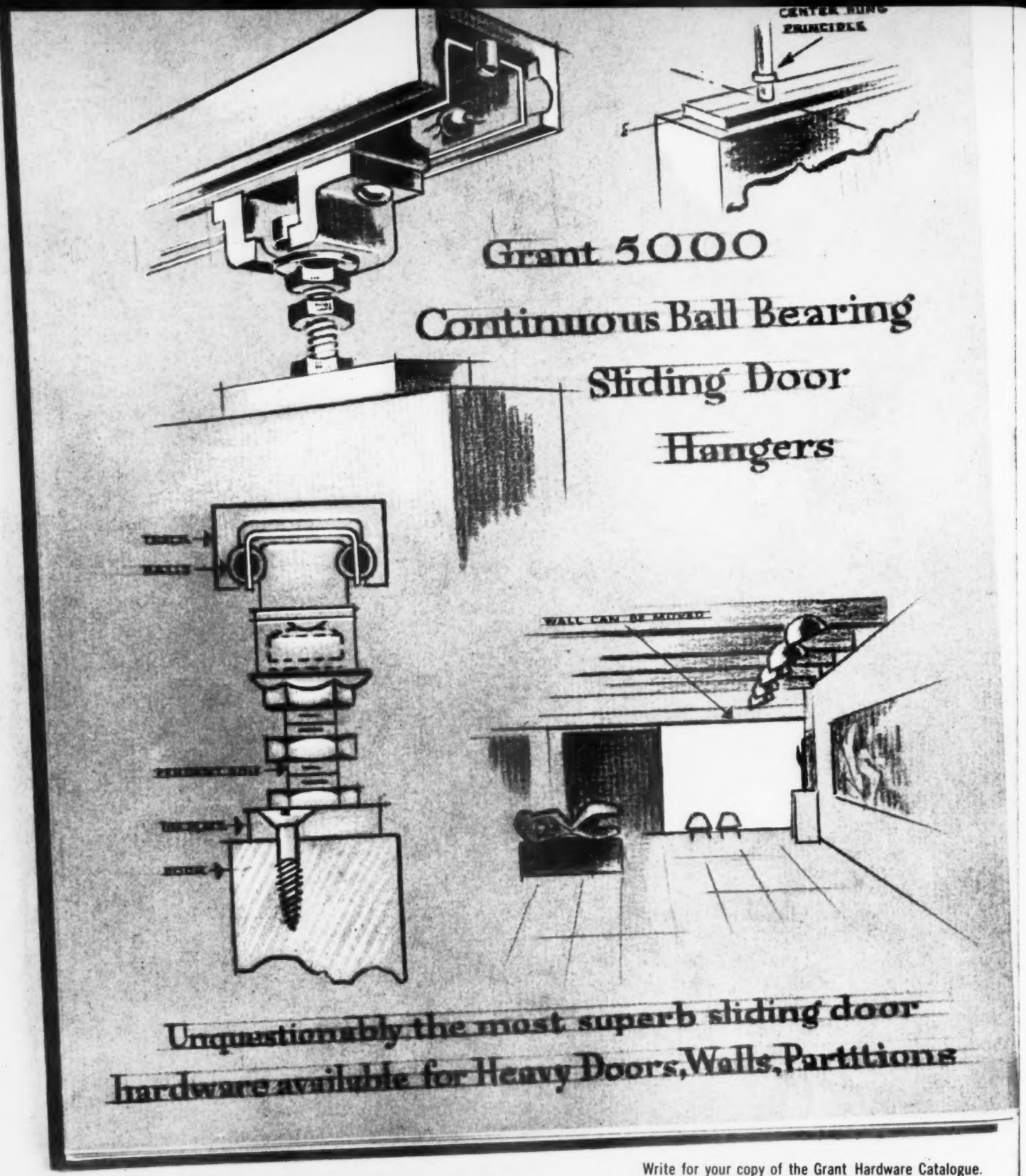
Break away from the old-fashioned concepts of building design. *Think in color!* STASO Glazed Brick and STASO KolorspeK offer unusual opportunities for modern individual design expression. For complete information and color samples, call your Darlington STASO brick distributor or write Central Commercial Company, Chicago.

Brick Builds Better Curtain Walls

STASO
Permanent Beauty in Color Ceramics
PRODUCTS

Also Manufacturers of Darlington Royal Face Brick

*T.M. Pending—Patent Applied For
A.I.A. File No. 10-B—Glazed Units



Write for your copy of the Grant Hardware Catalogue.

GRANT SLIDING HARDWARE

GRANT PULLEY AND HARDWARE CORPORATION

Eastern Division/ 133 High Street, West Nyack, N. Y.
Western Division/ 944 Long Beach Ave., Los Angeles 21, Calif.

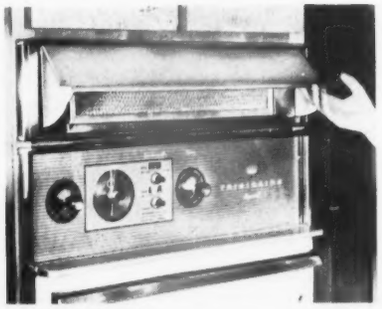
sliding door hardware • drawer slides • drapery hardware • pocket frames • pulls • closet rods • special sliding hardware

hour. Heat resistant silicone-aluminum pad covers are provided, designed at worst to char, with safety factor of seven times cut-off time limit. Extra convenience outlets, in addition to iron cord plug-in is provided for 115 volt appliances. Safety feature is pilot light and reset type circuit breaker, all built into single, handy control panel. When ironing conveniences are not in use, cabinet door closes tightly and adds functional decoration of plate glass mirror to room. Production tool models now list at $109.50; volume-run prices are expected shortly.

AIA FILE NO. 17-D

MFR: CADIZ ELECTRIC CORP.

Circle 212 for further information



FOLD-AWAY OVEN HOOD

MFR'S DESCRIPTION: oven hood-fan that goes on and off automatically when hood is raised or lowered.

USES: with electric or gas ovens.

SPECS/FEATURES: when closed, hood is flush with oven front. As it is raised, fan turns on. *3200 Series Oven Hood-Fan* is available in stainless steel or antique enamel. Sizes are: 24", 27", 32". Price, $17.46; power unit, $34.50.

AIA FILE NO. 30-D-1

MFR: NUTONE, INC.

Circle 213 for further information

PLUMBING UNITS

SPACE SAVING WATER FILTER

MFR'S DESCRIPTION: compact water filter designed for use where space is problem.

USES: residential and small commercial applications.

SPECS/FEATURES: filter will remove from water all precipitated iron oxide particles, sand, silt, or any sediment visible to eye. *No. 9* water filter is 14" high and 4¾" in diameter. It will handle flows up to ten gallons per minute, pressures up to 130 psi and temperatures to 100°F. Mfr cites easy-to-install unit featuring replaceable porous stone cartridge that can be cleaned and reused. No tools needed to remove or replace cartridge.

AIA FILE NO. 29-D-31

MFR: CALGON CO., DIV., HAGAN CHEMICALS & CONTROLS, INC.

Circle 214 for further information

ROUND STAINLESS STEEL LAVATORY

MFR'S DESCRIPTION: addition of round lavatory to line of stainless steel sinks, counter tops, drinking fountains, and cabinets.

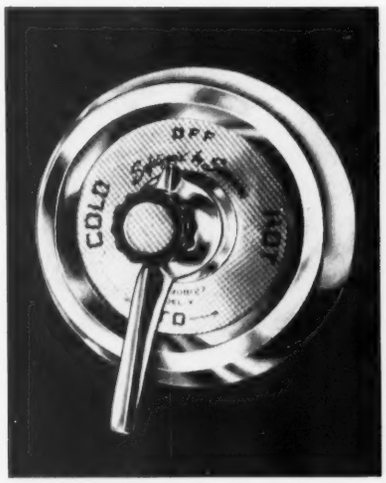
USES: residential and institutional applications.

SPECS/FEATURES: lavatory is fabricated with faucet ledge and self-rim which eliminates need for separate sink rim. Lavatory is available with or without provisions for connected overflow. It has No. 4 finish.

AIA FILE NO. 29-H

MFR: JUST MANUFACTURING CO.

Circle 215 for further information



NON-SCALD SHOWER VALVE

MFR'S DESCRIPTION: *Super Safetymix* has fingertip controls for both temperature and volume; temperature control handle has incorporated in it, knob for dialing desired volume of water eliminating fumbling for right adjustment.

USES: residential and institutional applications.

SPECS/FEATURES: unit has leak-proof

←Circle 121 for further information about GRANT PULLEY

SEEMORE SAYS: LOOK! NEW!

Guth brascolite

GYM LIGHTS

You relamp 'em without ladders

FROM ABOVE OR BELOW

From above, just snap-out the reflector. From below, use a relamping stick. No sky-high ladders to mess with!

They're available with hinged wire guard and 40° shielding louver —and with louver or guard only. Both pendant and recessed units are listed by Underwriters Laboratories, Inc.

High quality 30°, 60° or 90° beam ALZAK reflector for high efficiency, easy maintenance, long life.

THERE ARE MANY MORE GUTH GYM LIGHTS TAKE YOUR PICK:

Single, double, triple and quadruple units, for high or low bay installations, 100% downlight or with 15% uplight, round or square, pendant or recessed.

WRITE FOR GYM LIGHTING DATA SHEETS TODAY!

Guth THE EDWIN F. GUTH CO.

St. Louis 3, Mo.

TRUSTED NAME IN LIGHTING SINCE 1902

Circle 122 for further information

seal as well as built-in, self-cleaning action, permitting effective use in areas where water has high mineral content. Leak-proof spindle seal should never require replacement, mfr states. Unit has high style golden dial panel. Construction throughout consists of virgin bronze. Exposed parts are triple-plated in bright, gleaming chrome.
AIA FILE NO. 29-H-3
MFR: SYMMONS ENGINEERING CO.
Circle 216 for further information

SMALL STAINLESS STEEL SINKS

MFR'S DESCRIPTION: line of *Compact* stainless steel sinks.
USES: bars, kitchenettes, trailers, boats, hotels, snack bars, rumpus rooms, or wherever a smaller size bowl is desired.
SPECS/FEATURES: inside dimension of bowl is 12" x 12", depth is 6", in one, two, or three bowl types, with ledge back or flat rim models available with frames. Also available with exclusive *Uni-Seal* self-rimming type feature. All available in three grades with *Butler* finish.
AIA FILE NO. 29-H-6
MFR: VANCE INDUSTRIES
Circle 217 for further information

SPRINKLER SYSTEMS

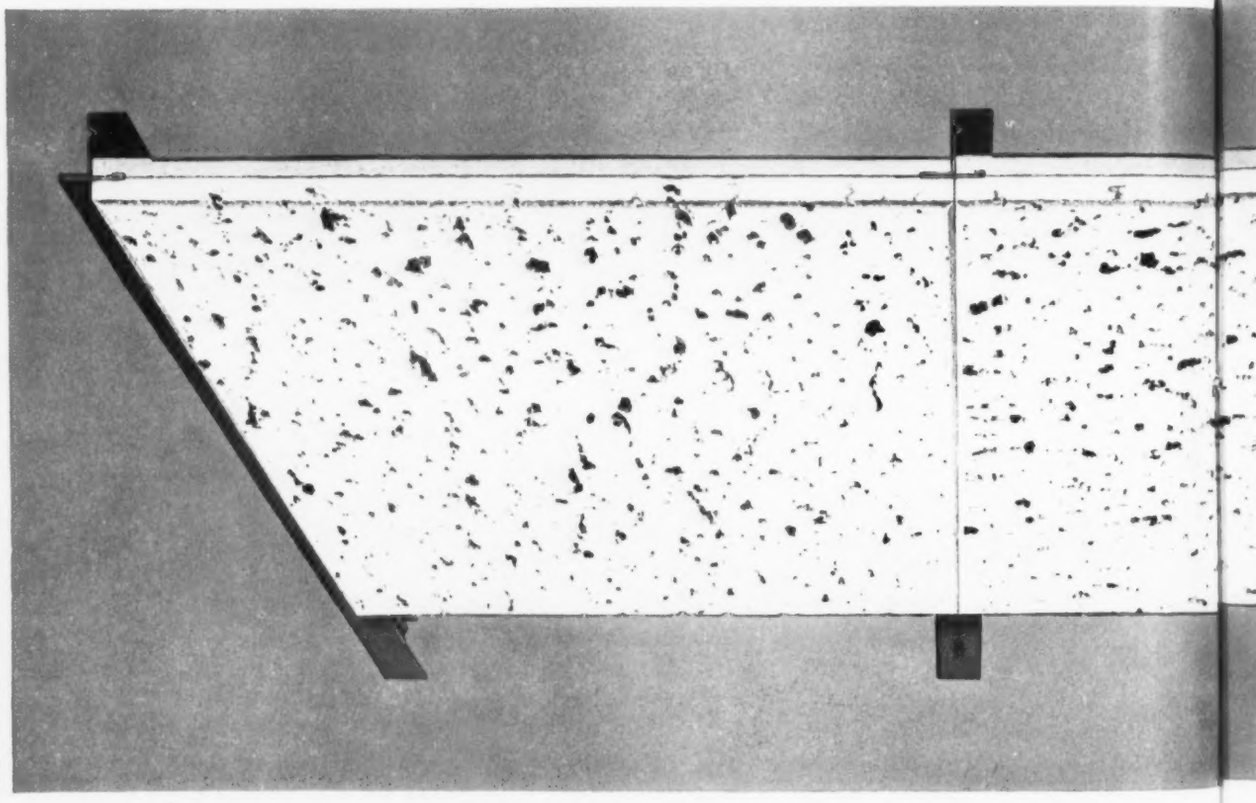
WATERFLOW ALARM PRESSURE CONTROL

MFR'S DESCRIPTION: *J7X-5355* is low-cost pressure control.
USES: electric motor and alarm circuits in sprinkler systems.
SPECS/FEATURES: FM approved and UL listed, it may be used with alarm check valves, dry-pipe valves, and special water control valves to actuate electric alarm when valves operate. Pressure settings are easily

Rule:

"Installation of acoustical materials should not be made when the building is excessively cold and damp or hot and dry. Temperature and humidity conditions closely approximating the interior conditions which will exist when the building is occupied should be maintained before, during, and after installation. All plastering, concrete, and terrazzo work (including grinding) should be complete and dry."

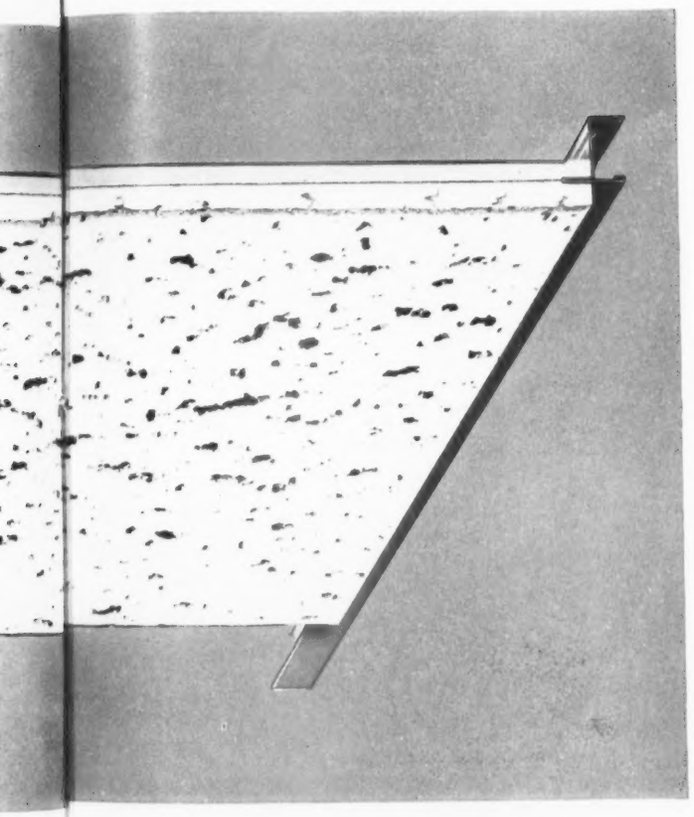
Bulletin XX—1960, Acoustical Materials Association



Exception:

New Gold Bond Acoustiroc, a felted mineral wool acoustical tile, is safe to install under most humidity conditions.

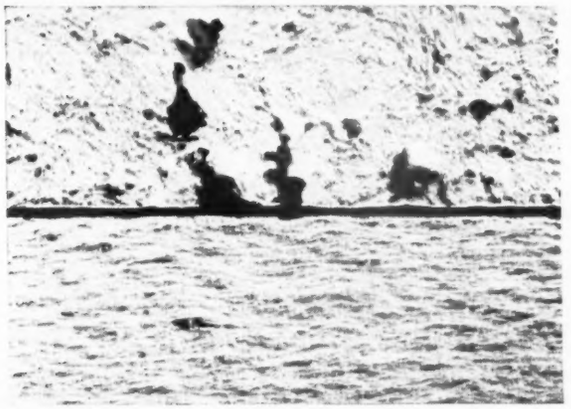
Circle 123 for further information



Gold Bond
BUILDING PRODUCTS

a step ahead
of tomorrow

Conventional mineral wool tile is made without fibre directional control, resulting in an uncontrolled variation in fissuring (often undesirable) and less stability in the tile.



New Acoustiroc is made of longer mineral wool fibres, interlocked through felting for greater strength and humidity resistance. Fissure variation is in a controlled range, with no tiles identical.

Tiles don't sag. 12" x 12" Acoustiroc tiles will not sag or warp under temporary high humidity conditions. Ceiling can be safely installed before plaster or terrazzo work is dry. Completion time can be speeded by a week or more.

Felted for strength. That's because new Acoustiroc is made of longer mineral wool fibres, felted together for greater strength. Acoustiroc has 500% greater sag resistance, 100% greater dimensional stability and 50% greater strength than other fissured mineral wool tiles.

Mineral Wool panels now suitable for grid system. This extra strength means that 24" x 24" Acoustiroc panels will support their own weight in a grid system without sagging when installed under normally dry conditions.

Many patterns. Acoustiroc Panels are now available in fissured, textured and random perforated patterns. 12" x 12" tiles come in all panel patterns plus striated. Ask your Gold Bond® Representative for full details, or write Dept. AE-1060 for free samples and literature.

NATIONAL GYPSUM COMPANY, BUFFALO 13, NEW YORK

Circle 123 for further information

PRODUCTS, EQUIPMENT, MATERIALS

made by internal adjustment nut. Adjustable range is 0 to 20 PSI with range stop provided to prevent adjustments above 20 PSI. Proof pressure is 300 PSI and maximum pressure, 500 PSI. Enclosure is die cast aluminum with black wrinkle finish. Bellows housing is brass and unit weighs approximately 12 ounces. Switch actions are normally open, normally closed, or double throw. Switches are single pole, and suitable for ambient temperatures up to 180° F. Standard electrical rating is 15 amps, 120/240 volts, ac. Other approved ratings are available.

AIA FILE NO. 31-i-34

MFR: UNITED ELECTRIC CONTROLS, INC.

Circle 218 for further information

AUTOMATIC CONTROL FOR SPRINKLER SYSTEMS

MFR'S DESCRIPTION: manually operated lawn sprinkler systems may be quickly and economically converted to automatic operation with valve adapter.

USES: existing lawn sprinkler systems.

SPECS/FEATURES: adapter works with present piping and valve bodies so that lines in ground need not be disturbed. Installation is made by removing valve stem and bonnet of old valve and screwing an adapter into place instead. Each adapter is then linked by wiring or hydraulic tubing to centrally located automatic controller. Controller is set to open and close valves individually according to desired watering schedule. Adapters may be either electrically or hydraulically operated and are available for converting any of fol-

Free 11" x 17", 4-color Wall Chart, suitable for hanging.

In seconds, you can find every known wiring device configuration on this color-coded, 11" x 17" wall chart . . . and it's yours absolutely free if you mail the coupon below.

Alongside each female configuration is listed (1) its rating, (2) the catalog numbers of matching caps, receptacles, and connectors, (3) its page number in the Hubbell catalog.

Color blocks tell you quickly whether the configuration belongs to Grounding, Straight Blade, "Twist-Lock", or "Hubbellock" devices. You'll wonder how you ever got along without it!

This same 4-color chart information is also available in catalog page size (8½" x 11", 3-hole punched). Either the big wall chart or the 2-sided catalog page is absolutely free. Act now while the supply lasts.

ANOTHER TIME-SAVER!

18-Page Wiring Device Selector Guide . . . Only 50¢

In this handy, desk-sized selector guide, you can locate the catalog number of any Hubbell connecting device in a matter of seconds. Here's how it works:

1. Four index tabs—color-coded to match your wall chart—quickly guide you to pages listing Grounding, Straight Blade, "Hubbellock", and "Twist-Lock" configurations.
2. Configuration diagrams and ratings at the top of each page guide you to the column you want.
3. In this column you find catalog numbers and brief descriptions of all receptacles, caps, bases, and connectors made in this configuration, and their page numbers in the Hubbell catalog.

At only 50 cents a copy, this guide will more than pay for itself in time saved and errors prevented. Our supply is limited. So tape two quarters or five dimes to the coupon below, enclose in envelope, and get your copy by return mail. (Please print clearly.)

4-color Selector Guide, color-coded for easy wiring device group identification, 16 pages spiral bound and mounted in attractive, heavy-weight varnished cover.

HARVEY HUBBELL, INC. DEPT. AEN BRIDGEPORT, CONN.

☐ Send free Configuration Wall Chart. ☐ Send free Configuration Catalog Page.
☐ Fifty cents enclosed. Send Handy Selector Guide postpaid to:
(please print)

Name_____

Company_____

Street_____

City_____ State_____

Circle 124 for further information

PRODUCTS, EQUIPMENT, MATERIALS

lowing valves: Febco 300; Thompson 440, 441; Buckner 50; Gee 200 series; Moody; Alum-Brass; Champion.

AIA FILE NO. 38-K-3

MFR: FEBCO, INC.

Circle 219 for further information

LOW PRESSURE/GALLONAGE SPRINKLER HEADS

MFR'S DESCRIPTION: underground sprinkler heads designed for areas where supply lines are small and where water pressures are low.

USES: residential lawns.

SPECS/FEATURES: model *415C* covers full circle up to 46′ in diameter on 25 pounds pressure. Discharge is only four and one-half gallons per minute. It produces 38′ circle at 15 pounds with three and four-tenths gallons per minute discharge. Sprinkler embodies pop-up, rotary pendulum action and distributes drops of water evenly over entire area. Installs flush with turf using ¾″ by 4″ riser. Height of throw is 5′. Retail price is $6.95, individually packaged with three dozen to shipper, weight 31 pounds. Model *315C* covers full circle up to 35′ in diameter on 25 pounds pressure. Discharge is only three and two-tenths gallons per minute. It produces 28′ circle at 15 pounds and excellent coverage at even lower pressure. It has 4′ high throw. Retail price is $4.95, individually packaged with three dozen to shipping carton, 26 pounds. Both models are made of brass with special bearings and built-in filters.

AIA FILE NO. 38-K-3

MFR: RAIN JET CORP.

Circle 220 for further information

OFFICE AIDS

HIGH ACCURACY ALL WEATHER TRANSIT

MFR'S DESCRIPTION: model *50* is precision instrument with securely sealed, permanently lubricated ball bearing construction for accuracy under all climatic conditions.

USES: surveying.

SPECS/FEATURES: axes of transit are completely protected from dust and moisture. Bearings in spindle and telescope axis cannot bind. Permanent, all-temperature lubricant will not leak or evaporate. Wind pressure which causes ordinary instruments to lose accuracy by displacing oil film surrounding friction-type bearings, cannot affect this sealed instrument. Transit operates freely and accurately at temperatures ranging from −70° to +160° F. According to mfr, there is no need for cleaning axes. Bearing wear is practically eliminated. Maintenance is reduced to minimum. Glare free vertical and horizontal circles are engine-divided, precision cut graduations on sterling silver. They are flush-filled with non-reflective black enamel to reduce parallel reading errors. Five inch diameter verticle circle, graduated to 30 minutes, has double vernier which reads to one minute. Six and one-quarter inch diameter horizontal circle verniers also read to one minute. Ten and one-half inch telescope has minimum focus of three and one-half feet from axis to target.

AIA FILE NO. 35-N-8

MFR: CHARLES BRUNING CO., INC.

Circle 221 for further information

COMPLETE PORTABLE DRAFTING KIT

MFR'S DESCRIPTION: *Draftette* makes it possible to have handy at all times, everything needed to place creative ideas on paper in professional manner.

USES: drafting.

SPECS/FEATURES: 14 pieces feature portable instrument combining advantages of drawing board, T-square, triangle, and protractor in sturdy vinyl covered attaché case. Catalog available.

AIA FILE NO. 35-H-3

MFR: RETAKE, INC.

Circle 222 for further information

PLASTIC FILM LAMINATING

MFR'S DESCRIPTION: method of laminating papers, letters, cards, charts, photographs, and other written or printed documents with plastic film on *Thermo-Fax* copying machines.

USES: office duplicating.

Circle 125 for further information about GENERAL ELECTRIC→

WATER COOLERS AIA FILE No. 29D-42

General Electric Announces...

THE NEW SPACE-SAVING SHAPE IN WATER COOLERS

LIFT FOLDOUT—Tear out for filing

WATER COOLERS AIA FILE No. 29D-42

UNITS mount at any height—can even be
resting on the floor—for installations such as
where drinkers' heights may vary from norm
standards.

The NEW Space-Saving Shape in Water Coolers from General Electric

CAN SAVE AN EXTRA FOOT OF AISLE SPACE; INSTALLS FLUSH TO WALL

- **Unique three-way approach helps eliminate aisle "traffic jams", saves aisle space**
- **Wall-mounted and floor models available**
- **All plumbing completely enclosed, hidden from view**
- **Clean, modern, durable**

Take a good look at the latest news in water coolers—General Electric's new space-saving shape, now available in both wall-mounted and floor models.

A unique three-way approach invites access *from either side of the cooler,* as well as the front. Drinkers don't block aisles, providing over an additional foot of aisle space.

NO PLUMBING EXPOSED– All units mount *flush* to the wall, eliminating at least six inches of plumbing space behind the unit. All plumbing is completely enclosed. No unsightly pipes or valves mar the clean modern appearance.

CLEAN, MODERN, DURABLE– New General Electric coolers are designed for the most up-to-date office décor; yet are so durable they'll withstand the rough treatment often encountered on the factory floor or in much-travelled hallways. They're smart, attractive, and clean. The rich grey finish is designed to blend with any surroundings. Stainless steel panels are available as an optional extra.

ASK YOUR GENERAL ELECTRIC DISTRIBUTOR about the many Total Value features of these new coolers. He's listed in the yellow pages under "water coolers". Or write Section 761–07, General Electric Co., Commercial Equipment Department, 14th and Arnold Streets, Chicago Heights, Ill.

Progress Is Our Most Important Product

GENERAL ELECTRIC

–can even be installed
tions such as schools
y from normal adult

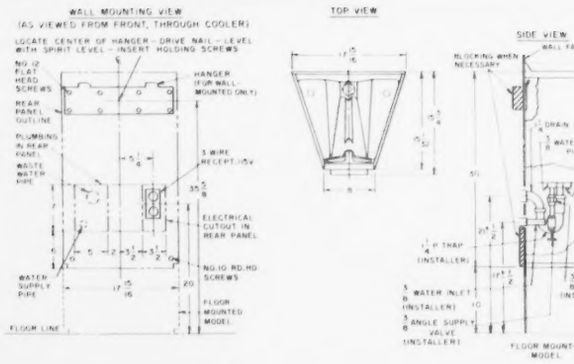
STREAMLINED STYLING of new General Electric water coolers blends with any surroundings. A no-squirt bubbler; anti-splash basin, and feather-touch, finger-tip control add to your comfort, convenience.

HOT-AND-COLD UNITS are available in the new space-saving design. Also, a hot-water accessory is available for quick, easy addition to installed units. Optional glass and carafe fillers are easy to install.

SIDE ACCESS helps keep drinkers from blocking aisle; prevents traffic congestion around the water cooler, and gives you over an additional foot of aisle space. Floor models feature a full-width foot pedal.

General Electric Announces...

THE NEW SPACE-SAVING SHAPE IN WATER COOLERS



Minimum width of niche when cooler is centered and recessed is 28 inches.
Minimum wall clearance on left side when cooler is off-center in niche is 5 inch

Wall-mounted Coolers	Model No.	Free-Standing (floor) Coolers
Standard Commercial	PW6	Standard Commercial
High-capacity Commercial	PWP11	High-capacity Commercial
Standard Commercial, Hot-and-Cold	PWH6	Standard Commercial, Hot-and-Cold
High-capacity Commercial, Hot-and-Cold	PWPH11	High-capacity Commercial, Hot-and-Cold

Wall-mounted models may be mounted directly on floor for children.

CONDENSED SPECIFICATIONS

General specifications for all models are 1/5 HP sealed compressor unit, 4 watt fa
maximum operating limits of 110F ambient temperature and 100F inlet water temperat

MODEL NO.	PW6	PWP11	PWH6	PWPH11	PF6(1)	PFP11(2)
Mounting	Wall	Wall	Wall	Wall	Floor	Floor
Precooler	No	Yes	No	Yes	No	Yes
Reservoir Net Vol. (Qts) COLD	5.7	5.7	5.7	5.7	5.7	5.7
Reservoir Net Vol. (Qts) HOT	—	—	2.0	2.0	—	—
Approx. Net Weight (Lbs)	100	105	105	110	110	115
Approx. Shipping Weight (Lbs)	105	110	110	115	115	120

(1) Meets mechanical and capacity requirements of Federal specification 00-0566C (Size 5.
(2) Meets mechanical and capacity requirements of Federal specification 00-0566C (Size 10.

Data and specifications subject to change without notice

NUMBER OF PEOPLE THESE COOLERS WILL SERVE AT RATED[2] CONDITIONS

(According to U.S. Dept. of Commerce Standard CS-127-45)

Application	Drinking water Temp. F	PW6 PF6 PWH6 PFH6	PWP11 PFP11 PWPH11 PFPH11
Office or school			
Bubbler service	50	73	132
Cup service	50	183	183
Industrial			
Light Mfg.	50	43	77
Heavy Mfg.	55	30	55
Hot Heavy Mfg.	60	24	44
Restaurant[1]	45	61	110
Cafeteria[1]	45	73	132
Hospital	50	73	132
Theatre	50	610 Seats	1100 Seats

Notes: 1. Special consideration should be given to peak-load demands for this application.
2. Rated conditions - 80F inlet water cooled to 50F in 90F ambient temp.

STANDARD POWER SUPPLY 115 Volts - 50-60 cycle AC. For non-standard AC power supply, see your G-E Apparatus representative regarding the following transformers:

TRANSFORMER CATALOG NO.	PRIMARY VOLTAGE RANGE	
	50 CYCLE	60 CYCLE
9T51Y5403	101-136	112-148
9T51Y5402	189-260	208-283

WC-1004
8-60

ACCESS

Hot water acces
quick, easy field
10HX97.

Carafe filler ac
field installation, C

Push-back glas
available for field
No. 10HX99.

Platform-type g
available for field
No. 10HX100.

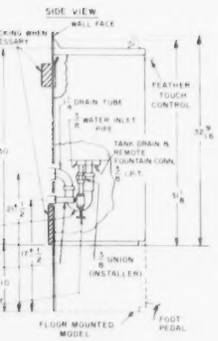
Water line strai
tion, Catalog No. A

Stainless steel f
available at extr
order

List
issu
For
the

GENE

Commercial Equi
14th & Arnold Stree



ed is 28 inches.
n niche is 5 inches.

or) Coolers	Model No.
ial	PF6
mercial	PFP11
ial,	PFH6
mercial,	PFPH11

for children.

S

unit, 4 watt fan motor output, and water temperature.

²)	PFP11(³)	PFH6	PFPH11
or	Floor	Floor	Floor
	Yes	No	Yes
	5.7	5.7	5.7
	—	2.0	2.0
	115	115	120
	120	120	125

ion 00-0566C (1-18-45) for Type I,

ion 00-0566C (1-18-45) for Type I,

hout notice

ACCESSORIES:

lot water accessory kit available for k, easy field installdtion, Cat. No. HX97.

Carafe filler accessory available for d installation, Catalog No. 10HX98.

Push-back glass filler accessory ilable for field installation, Catalog 10HX99.

Platform-type glass filler accessory ilable for field installation, Catalog 10HX100.

Water line strainer for field installa-, Catalog No. A1S22.

tainless steel front and side panels ilable at extra cost—specify on er

TYPICAL SPECIFICATIONS

Cooler specified shall be a self-contained electric water cooler with cooling capacity of at least ____gph from 80F inlet water to 50F drinking water in room ambient temperature of 90F.

Shall mount flush against the wall with all plumbing concealed; may be mounted on floor or at any wall height to suit application.

Top shall be of 302 stainless steel especially finished to reduce stains, scratches and fingermarks, with removable drain strainer to permit cleaning of drain pipe or precooler without removing top; glass and carafe filler accessories to be installable without disconnecting plumbing.

Front and side panels shall be easily removable, constructed of 19 gauge phosphatized steel painted with separate prime and baked enamel finish.

Refrigeration system shall be hermetically sealed; Freon-12 refrigerant flow controlled by capillary tube.

Anti-squirt, anti-hose bubbler shall have built-in pressure regulator to deliver smooth, even flow at supply pressures of 20 to 100 psi.

Water stream shall be operated by feather-touch, finger-tip control; located on cooler centerline and directed toward rear; approachable and drinkable from front and either side.

Cooling tank shall be anti-freeze, burst-proof, 302 stainless steel with copper refrigerant coil mechanically bonded to exterior. Temperature controlled by adjustable thermostat. Cooler shall have provision for addition of internal hot water system accessory.

Entire cooler shall carry written one year warranty and five year replacement agreement on entire refrigeration system.

Cooler shall meet U.S. Bureau of Standards specification CS127-45 and be listed by Underwriters' Laboratories.

Cooler shall be General Electric Model _____ or equal.

COOLING CAPACITY

(GALLONS PER HOUR COOLED TO 50F)

Room Temp.	Inlet Water Temp.	Model Number: PW6 PF6 PWH6 PFH6	Model Number: PWP11 PFP11 PWPH11 PFPH11
70F	70F	10.3	15.8
	80F	6.9	11.4
	90F	5.1	8.9
	100F	3.7	6.9
80F	70F	10.3	15.6
	80F	6.9	11.9
	90F	5.1	9.4
	100F	3.7	7.9
90F	70F	9.2	14.5
	80F	**6.1**	**11.0**
	90F	5.1	8.9
	100F	4.2	7.7
100F	70F	7.5	12.2
	80F	5.5	9.4
	90F	4.1	7.6
	100F	3.6	6.8

Notes: 1. For exclusive cup or remote service, capacity of PWP11, PFP11, PWPH11 and PFPH11, is same as PW6. Capacity of PW6, PF6, PWH6 and PFH6 same for bubbler, cup or remote service.
2. Bold face type indicates standard industry rating (A.S.R.E.).
3. For 50 cycle operation reduce power and capacity rating 15%.
4. Gallons of 50F water cooled per hour. One gallon serves 12 office, 7 light manufacturing, 5 heavy manufacturing workers, or 4 hot heavy manufacturing workers.
5. Ratings other than bold face are based on preliminary engineering studies and are subject to change without notice.

Listed by Underwriters' Laboratories, Inc. Complies with requirements of CS127-45 as issued by the National Bureau of Standards U.S. Department of Commerce.

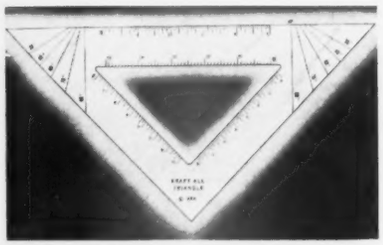
For more information, contact your nearby General Electric Distributor. He's listed in the yellow pages under "water coolers."

ENERAL ELECTRIC

mmercial Equipment Department
& Arnold Streets

Water Cooler Section
Chicago Heights, Illinois

SPECS/FEATURES: process extends versatility of existing copying machines made by mfr and involves no special equipment or adjustments. Insulating film permits protection of frequently handled papers, prevents tampering of cards or identification, and enhances appearance. Originals and sheets are inserted in machines and emerge a few seconds later completely bonded with tough, transparent seal that resists moisture, liquids, grease, and smudges. Average cost of laminating 8½" x 11" document on both sides ranges from 9¢ to 12¢ depending on quantities purchased.
AIA FILE NO. 35-H-4
MFR: MINNESOTA MINING AND MANUFACTURING CO.
Circle 223 for further information



MULTI PURPOSE DRAWING INSTRUMENT

MFR'S DESCRIPTION: instrument that combines advantages of protractor, straight edge, and scales.
USES: field work drafting, etc.
SPECS / FEATURES: permanently stamped into standard eight inches, 45°/90° plastic triangles, are four most popular scales; 1", ¼", 1/6", 1/10" as well as guide lines for construction of 90°, 75° (60°, 45°, and 30° line intersections. Easily stored in brief case.
AIA FILE NO. 35-H-3
MFR: DRAFT-ALL TRIANGLE CO.
Circle 224 for further information

LIGHTING FIXTURES

LOW-COST LUMINAIRE FOR CORRIDOR LIGHTING

MFR'S DESCRIPTION: low-cost luminaire controls lengthwise brightness.
USES: school locker corridors, library stacks, pedestrian tunnels, and similar applications.
SPECS/FEATURES: *VeeLens* features convex reflector and clear prismatic diffuser containing thousands of eight-sided prisms. Design concentrates high-level light on vertical wall surfaces yet provides controlled brightness when viewing down corridor. Formerly, according to mfr, only far more expensive fluorescent luminaires with intricate shielding, or incandescent luminaires with special lenses directed the useful light so effectively. Luminaires may be surface or pendant mounted, individually or in continuous rows. Two sizes are available: 4' luminaire for one 48" 430ma rapid-start lamp, and 8' luminaire for two 48" lamps, tandem. Diffusers hinge from either side.
AIA FILE NO. 31-F-23
MFR: LIGHTING PRODUCTS, INC.
Circle 225 for further information

TAMPER-PROOF FIXTURE FOR SECURITY AREAS

MFR'S DESCRIPTION: tamper-proof, moisture-sealed fluorescent light fixture.
USES: institutional and other indoor and outdoor applications where it is essential to prevent unauthorized persons from disengaging enclosure.
SPECS/FEATURES: known as *Security 700* series, fixture is 49½" long, 12¼" wide, 5¾" deep, and is available in two or four, 48" rapid start lamps. Curved *Plexiglas* enclosure provides uniform diffuse illumination in all directions with high efficiency. Gaskets are of pliable polyurethane foam in flexible vinyl tubing impervious to effects of oil, grease, paint, light, or air. When enclosure is secured, resulting solid compressed seal cannot be penetrated by moisture or sharp instruments. Enclosure can be released only by unscrewing retaining bolt at each end of fixture with an Allen wrench. After bolts are released, plastic enclosure suspends on cable and swings to either side at distance to permit cleaning and removal of the farthest lamp from fixed position on ladder. Entire enclosure releases to hang from one end to facilitate cleaning and permit use of both hands for ballast replacement.
AIA FILE NO. 31-F-22, 28
MFR: GLOBE ILLUMINATION CO.
Circle 226 for further information

←Circle 125 for further information about GENERAL ELECTRIC

HOW TO WATCH WITHOUT BEING SEEN

From the darkened room, it's a window . . .

From the bank floor, it's a mirror!

Mirropane® has many uses . . . in banks, hospitals, schools, stores, homes . . . anywhere that it's desirable to observe—in person or with a camera—without being seen. *Mirropane*, when made with *Parallel-O-Grey*® glass, provides "see-thru" vision with light differentials as low as 3 to 1 between rooms. For more information, call your L·O·F Distributor or Dealer (listed under "Glass" in the Yellow Pages) or refer to Sweets Architectural File 26-A.

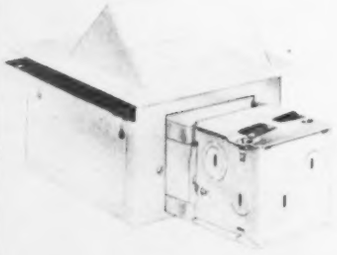
MIRROPANE
the "see-thru" mirror

L·O·F GLASS

LIBBEY·OWENS·FORD GLASS CO.
811 Madison Avenue, Toledo 1, Ohio

Circle 126 for further information

PRODUCTS, EQUIPMENT, MATERIALS



RECESSED INCANDESCENT LIGHTING FIXTURE UNIT

MFR'S DESCRIPTION: 40° recessed wall washer unit for specialized lighting applications.

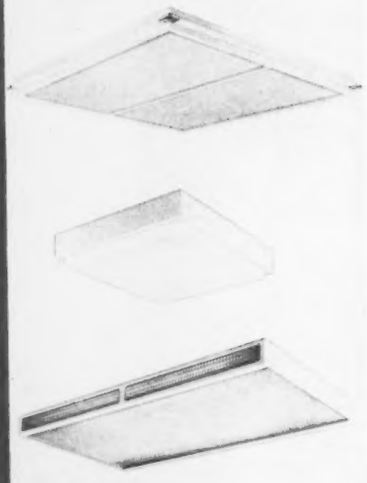
USES: homes, offices, motel and hotel lobbies, store displays, planting areas, paintings, exhibits, etc.

SPECS/FEATURES: diecast one-piece frame size is 7½" square with finish opening size of 6¾" square. Housing size is 6⅝" x 10¾" x 4". Sixty watt bulbs are recommended. Complete prewired unit comes in standard matte white baked enamel finish with aluminum finish available at no extra cost.

AIA FILE NO. 31-F-21

MFR: PRESCOLITE MANUFACTURING CORP.

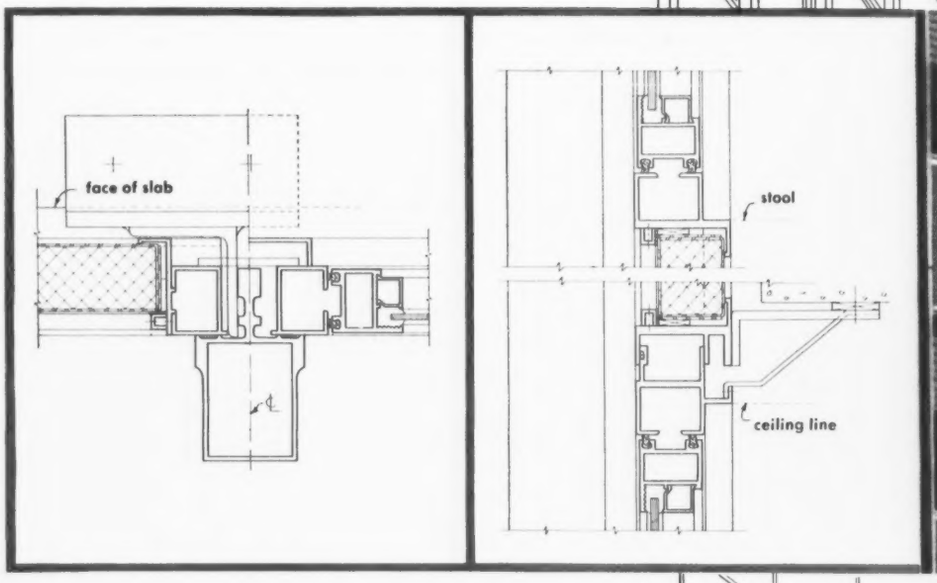
Circle 227 for further information



SURFACE MODULE FLUORESCENT FIXTURES

MFR'S DESCRIPTION: line of *Slimlux Surface Modules* offers complete versatility and variety for most on-ceiling lighting requirements.

Circle 127 for further information→



ALBRO SERIES 400
METAL CURTAIN WALL

- unusual versatility of section
- extreme design latitude
- light-weight, economical system
- fast, easy installation
- erected from inside, with no work stoppage from weather
- especially adaptable to high and extra high-rise structures

New Design Flexibility in Curtain Walls

In a refreshing new approach to metal curtain wall construction, Albro's new Series 400 offers the architect unusual design latitude. Specially created for high-rise structures, Series 400 provides a choice of architecturally interesting wall patterns in a precision-engineered, easy-to-install system.

All accepted spandrel panel materials can be combined with fixed or reversible windows for a variety of visual effects. Albro's Series 400 curtain wall is erected in independent mullion and one-story units consisting of sash and panel frame. The sizes of the sections are relatively independent of the building height. Although light in weight for speedy and efficient site installation, Series 400 is fabricated from substantial aluminum extrusions of custom quality. These standard sections are integrally keyed for weather-tight seal, simplified erection, and with adequate provisions for expansion and contraction. Series 400 is designed to be erected from inside the structure, providing the advantage of all-weather installation.

Series 400 is only one of the complete line of Albro metal curtain wall systems in aluminum, bronze and stainless steel (see them all in Sweets Architectural Catalog). More than thirty years of architectural metal engineering are behind the Albro curtain wall you specify. Albro's acceptance of total responsibility for every phase of your curtain wall project is your assurance of total satisfaction.

For additional information, write on your professional letterhead to:

ALBRO METAL PRODUCTS CORPORATION

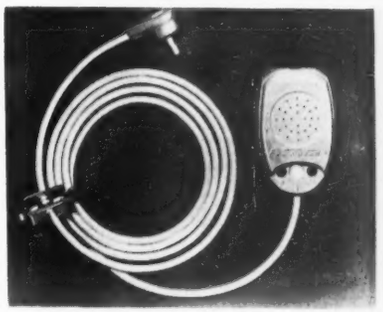
Dept. A, 944 Longfellow Avenue, New York 59, N.Y.

Circle 127 for further information

PRODUCTS, EQUIPMENT, MATERIALS

USES: commercial applications.
SPECS/FEATURES: units are available in 1′ x 4′, 1′ x 8′, 1½′ x 4′, 1½′ x 8′, 2′ x 2′, 2′ x 4′, 2′ x 8′, and 4′ x 4′ modules for rapid start and slimline lamps. Selection is made from four different side designs—*S.S. Slimlux* with solid steel sides, *L.W. Slimlux* with reeded plastic light windows, *Slimfin* with fin-glow light beam sides, or *PSGXS* with prismoid light windows. Large choice of bottom enclosures is also offered. Modules are constructed of heavy gage, zinc-coated phosphatized steel and finished in 300° baked-on white acrylic enamel. *Slimfin* models can also be finished in bronze or silver finishes.
AIA FILE NO. 31-F-21
MFR: EDWIN F. GUTH LIGHTING CO.
Circle 228 for further information

INTERCOM UNITS



PILLOW SPEAKER WITH TV, RADIO, NURSES CALL

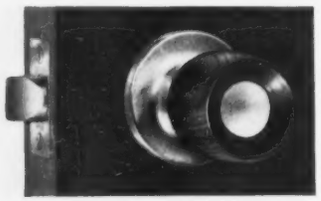
MFR'S DESCRIPTION: lightweight pillow speaker which includes radio and television controls and button for originating calls to nurse.
USES: hospitals.
SPECS/FEATURES: pillow speaker is compact instrument for good low level reproduction. Includes volume control, nurse call, origination button and channel selector buttons for radio and TV. All patient-to-nurse conversations are conducted through separate patient's bedside station on wall designed to pick up faintest sound in patient's room. Station is equipped with four inch diameter speaker which reproduces two-way voice communication with perfect clarity, mfr states. Unlike pillow speaker which may become disengaged from wall, station is in fixed position to assure patient of instant and uninterrupted voice communication. Pillow speaker is equipped with moulded plug which makes it

exotic wood knobs for interiors...

by russwin

Russwin Stilemaker Doorware with wood knobs of rich, rare cocobolo, rosewood, walnut and ebony. These distinctive colorful knobs enhance any interior decor and are extremely durable.

Stilemaker heavy-duty doorware is constructed for long, trouble-free service. For details on complete line, write Russell & Erwin Division, The American Hardware Corporation, New Britain, Connecticut.



RUSSWIN

Circle 128 for further information

ENGINEERED by EDWARDS

FREE TO ARCHITECTS

70 page heating and cooling design handbook featuring low cost zone control hot water and electric baseboard heat!

This comprehensive reference guide tells you how to get zone control heating and cooling for little more than the cost of non-zone systems. Ideal for schools, churches, apartment houses, shopping centers, homes, industrial parks.

ONLY EDWARDS OFFERS A COMPLETE HEATING AND COOLING SYSTEM—including packaged boilers, long-length Box-Fin baseboard radiation, compact motorized zone valves and electric baseboard radiation featuring low surface temperatures. Write today for your free handbook!

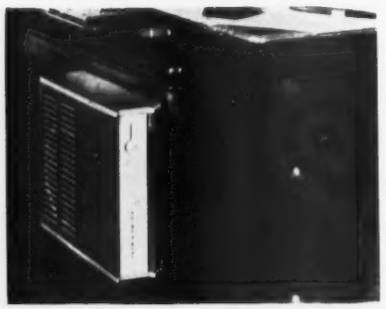
EDWARDS ENGINEERING CORP.
3941 Alexander Ave. • Pompton Plains, N. J.
TEmple 5-2808

"One of the nation's largest manufacturers of Residential and Commercial Boilers, Baseboard and Steel-Fin Radiation, Motorized Valves, Air and Water-Cooled Refrigerant Condensers."

Circle 129 for further information

PRODUCTS, EQUIPMENT, MATERIALS

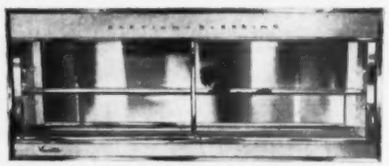
removable. This protects patient by automatically initiating call when sufficient presure is exerted to pull plug out of receptable. Unit is interchangeable with four standard types of nurse call origination devices.
AIA FILE NO. 31-i-41
MFR: EXECUTONE, INC.
Circle 229 for further information



DESKSIDE INTERCOM

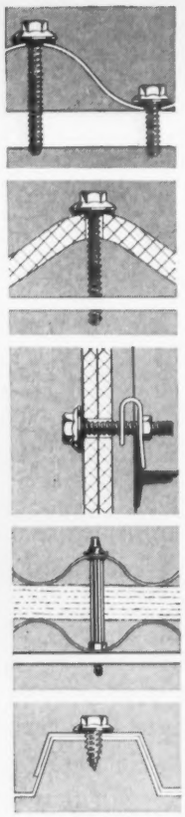
MFR'S DESCRIPTION: deskside intercom offers more efficient use of office work space by providing versatile placement of units.
USES: office applications.
SPECS/FEATURES: bracket attachment, optional with all new *Talk-A-Phone* office and industry models, makes it possible to place intercom on side of desk, on walls, tables, or in other positions, thus freeing additional work space.
AIA FILE NO. 31-i-51
MFR: TALK-A-PHONE CO.
Circle 230 for further information

STEEL FURNITURE



STAINLESS STEEL DISPLAY CASE

MFR'S DESCRIPTION: stainless steel display case for cold foods.
USES: commercial display applications.
SPECS/FEATURES: available in 4′ length, refrigerated or non-refrigerated, with adjustable glass shelf and either self-closing or manual closing glass doors. Colorful plastic laminates insets at top and bottom of case, factory installed as ordered to match store decor. Strong fluorescent light and crystal glass mirror, angled to povide visibility at any



TOWNSEND gives you the complete package— the correct fastener plus field service

Townsend Tuff Tite fasteners are specifically designed for use with each type of construction material and method of application. This enables Townsend engineers to give you impartial assistance in selecting the right fastener for your particular job.

The wide variety of Tuff Tite fasteners gives you the advantage of leakproof construction for all types of roofing and siding.

Each Tuff Tite is made with an integral head and washer plus an assembled neoprene washer, which is trapped by the undercut in the head when the fastener is tightened. The result—positive leakproof construction.

Write for Bulletin TL-149 to **Townsend Company, Engineered Fasteners Division, P.O. Box 71-V, Ellwood City, Pennsylvania. In Canada:** Parmenter & Bulloch Manufacturing Company, Limited, Gananoque, Ontario.

Circle 130 for further information

MULTIROLL FILES
FOR FILING · STORING · SEGREGATING

TRACINGS BLUE PRINTS SHEET MATERIAL

FILE CONSTRUCTED IN 200-lbs-Test CORRUGATED CONTAINER

Depth	11¼″	22¼″	30½″	36½″	42¼″
49 Tube Model 1¾″ I.D.	49AB $7.50	49CD $9.50	4930 $12.80	4936 $13.80	4942 $14.80
25 Tube Model 2¼″ I.D.	25AB $7.00	25CD $9.00	2530 $11.80	2536 $12.80	2542 $13.80
	Shipping Weight				
Model 49	8 lbs.	12 lbs.	15 lbs.	18 lbs.	20 lbs.
Model 25	6 lbs.	10 lbs.	13 lbs.	15 lbs.	17 lbs.

Sold in Sets Only— 2 JR36 Per Set

ENAMELED MED. GRAY

JR 36

DESIGNED TO MOUNT UNDER BOARD MOUNTING BRACKETS FURNISHED.

9.50 SET of TWO

8 lbs. Ship wt.

F.O.B. St. Clair Shores, Mich. • PRescott 3-2515 • *SOLD DIRECT ONLY*
Write to Dept. B-2

ROLL & FILE SYSTEMS, INC. - P.O. BOX 3863, DETROIT 5, MICH.

Circle 131 for further information

height. Wall mounting strips for top and bottom are included with each case.

AIA FILE NO. 35-C-12

MFR: BASTIAN-BLESSING CO.

Circle 231 for further information

TEACHER'S BOOK CASE AND WARDROBE LOCKER

MFR'S DESCRIPTION: combination steel book case and wardrobe locker for teachers.

USES: schools and colleges.

SPECS/FEATURES: locker has double doors and is equipped with book shelves and two coat hooks. Other features include: internal lift door handle, continuous strike door frame, full-loop door hinges, and optional *Auto-lock* which eliminates conventional door handle and permits doors to be opened with heavy-duty key. Door frame is made by intermembering and lapping top and side members of heavy-gage steel frame. This helps frame maintain true rectangular shape and resist twisting and stress. Full-loop steel hinges on which door are firmly hung, are .050 inch thick. They are said to offer strength advantages over hinges in which each leaf is merely turned back in half a circle. Locker is 66" high (including 6" base), 22" wide, and 15" deep. It is supplied with closed base. An optional sloping top aids housekeeping by preventing dust and litter accumulation. Ventilation is assured through 12 louvers on upper and lower parts of each door. Standard colors are gray, green, and tan. Decorator colors are also available.

AIA FILE NO. 35-B-4

MFR: PENCO DIV., ALAN WOOD STEEL CO.

Circle 232 for further information

YOU CAN'T HAVE **ADEQUATE** SECURITY WITHOUT

MAXIMUM SECURITY

ADAMS RITE's exclusive **MAXIMUM SECURITY** for narrow stile doors is accomplished by bridging the opening between the lock stile and the strike with a bolt of laminated steel—measuring a full 1⅜" from a backset as short as ⅞". As much of this bolt is retained within the lock stile as is projected, making forced entry impossible without complete destruction of the door channel. Compare the Adams Rite **MS** lock—with its protective long bolt—with ordinary locks and you'll see why adequate security means **MAXIMUM SECURITY.**
Write today for complete specifications and information.

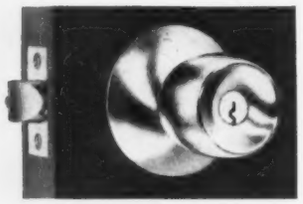
ADAMS RITE
MANUFACTURING COMPANY
540 West Chevy Chase Drive, Glendale 4, California

Circle 132 for further information

classic designs in metals...

by russwin

The Russwin Jet Design Stilemaker — A heavy-duty cylindrical lockset beautifully proportioned in brass, bronze, or aluminum . . . all standard finishes. Abuse-proof Russwin construction, with heavy steel chassis and phosphor bronze springs. Distinctive . . . dependable. For details on complete line, write Russell & Erwin Division, The American Hardware Corporation, New Britain, Connecticut.

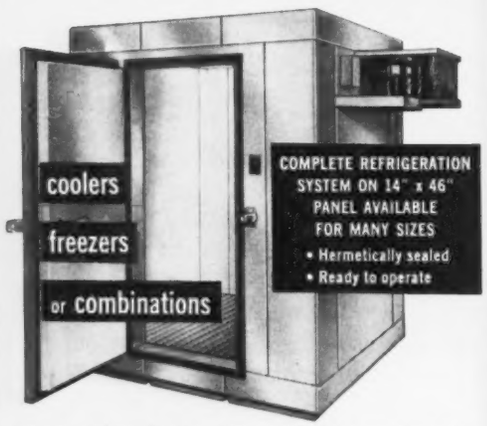


RUSSWIN

Circle 133 for further information

Bally **walk-ins**

Aluminum or steel sectional construction



Sanitary! Strong! Efficient! You can assemble any size cooler, freezer or combination in any shape from standard sections. Add sections to increase size as your requirements grow. Easy to disassemble for relocation.

ARCHITECTS: see 8 pages of engineering data in Sect. 26/A of Sweet's Catalog.

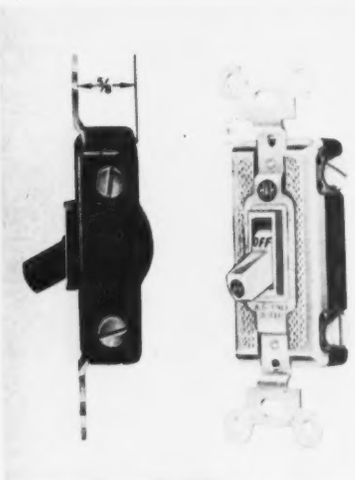
Bally Case and Cooler, Inc., Bally, Pa.

Get details—write AN-10 for FREE book

Circle 134 for further information

PRODUCTS, EQUIPMENT, MATERIALS

ELECTRICAL DEVICES



SPACE SAVER SWITCH FOR THIN-WALL CONSTRUCTION

MFR'S DESCRIPTION: addition of space saving model to line of *Quiette* switches.

USES: thin-wall construction.

SPECS/FEATURES: designed to fit 1¼" boxes and allow ample space from wiring, switch is only ⅝" deep from face to back. Other features include: quiet mechanical operation without mercury or other fluids; continuous operation on any position; completely enclosed base; two anchor holes at each binding screw to hold wire during looping, extra-large binding screws with deep-cut slots; and special plateau handle enclosure that completely fills wall plate opening. Rated at 15 amperes, 120-127 volts, ac only, switch is available in single-pole, double-pole, three-way, and four-way types and can be supplied in Ivorylite or brown Bakelite.

AIA FILE NO. 31-D

MFR: ARROW-HART & HEGEMAN ELECTRIC CO.

Circle 233 for further information

PLUG-IN CIRCUIT BREAKERS TO 100 AMPS

MFR'S DESCRIPTION: line of type QO circuit breakers has been expanded with addition of type Q1 breaker available in 70 and 100 ampere trip ratings for two and three pole applications.

USES: with all existing type QO load centers and NQO panelboards.

SPECS/FEATURES: standard Q1 breakers are supplied with terminal suit-

RUGGED and RIGHT!

BOMMER INDUSTRIAL HINGES and SPRING STEEL BUMPERS

#17042 Industrial Hinge
#170 Spring Steel Bumper

Ideal for industrial trucking doors—heavy duty—double acting — four springs in each hinge—individually adjustable—no sagging—door held securely by box clamps and thru-bolts—bumpers absorb shock of motorized trucks — protect doors — simple installation—variety of finishes.

BOMMER
SPRING HINGE CO. INC.
PIONEERS OF THE SPRING HINGE INDUSTRY
EXECUTIVE OFFICE AND PLANT: LANDRUM, S. C.

Sales Offices and Warehouses
263 Classon Ave., Brooklyn, N. Y.
180 N. Wacker Drive, Chicago, Ill.

Circle 135 for further information

we put the "You" in

UNITRON®

YOU ....need only one carrier to fit both wall-hung syphon jet and blow-out bowls

YOU ....save time and prevent error in the selection of carriers

YOU ..secure savings in valuable space by the use of compact units

YOU ..get interchangeability and adjustability in the same carrier

YOU ....can select the right carrier and closet fitting for every requirement from a complete line.

UNITRON
CARRIERS and CLOSET FITTINGS

also for
LAVATORIES • URINALS
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Josam

JOSAM MANUFACTURING CO.
Dept. AN-10 Michigan City, Indiana
Representatives in all Principal Cities
Josam products are sold through plumbing supply wholesalers.

Circle 136 for further information

PRODUCTS, EQUIPMENT, MATERIALS

able for use with both copper cable and aluminum conductors. Lugs are UL approved for copper cable size No. 1 to No. 8 AWG and aluminum cable size No. 0 to No. 6 AWG. Plug-in construction simplifies installation; Q1 breakers can be wired outside box and then simply plugged onto bus for line connection. Temperature compensation prevents nuisance tripping and plated jaws and connectors assure positive connections. Visual trip indication is provided.

AIA FILE NO. 31-D-4

MFR: SQUARE D CO.

Circle 234 for further information

HARDWARE

STYLE LINE IN DOOR HARDWARE

MFR'S DESCRIPTION: line of escutcheon styles.

USES: decorative applications.

SPECS/FEATURES: 8¾" square, shield-shaped dish, which mounts flush to door surface and allows flared edges to stand out. It is pictured with concave knob and 2½" rose. Minimum backset for unit is 5". Catalog available.

AIA FILE NO. 27-B

MFR: CHALLENGER LOCK CO.

Circle 235 for further information

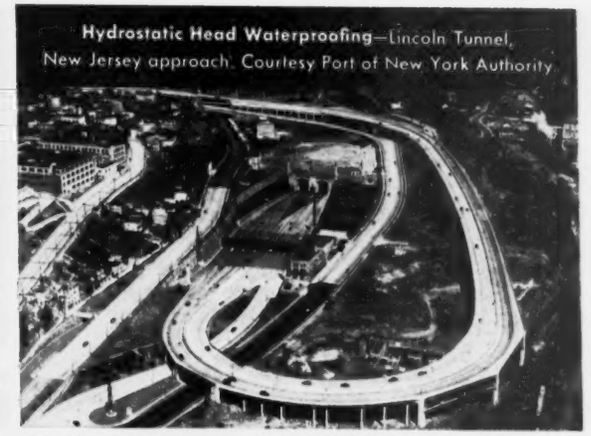
DECORATOR DOOR PULLS

MFR'S DESCRIPTION: line of decorator door pulls available in six colors.

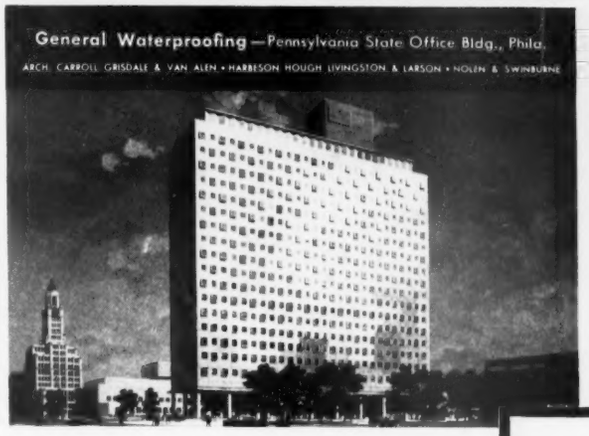
USES: any sliding door application, by-passing doors, pocket doors, cabinets, or sliding windows.

SPECS/FEATURES: made of high impact, shatter-proof plastic, pulls will not crack, mar, or tarnish, Installed by merely drilling hole in door 2" in diameter and 5/16" deep,

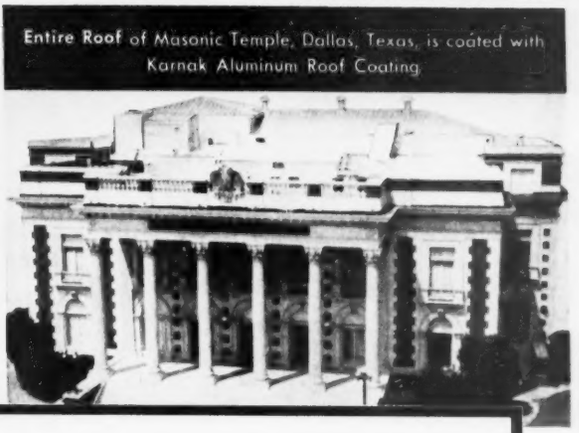
General Waterproofing—Boilers of this plant are below the level of nearby Delaware River



Hydrostatic Head Waterproofing—Lincoln Tunnel, New Jersey approach. Courtesy Port of New York Authority



General Waterproofing—Pennsylvania State Office Bldg., Phila.
ARCH. CARROLL GRISDALE & VAN ALEN • HARBESON HOUGH LIVINGSTON & LARSON • HOLEN & SWINBURNE



Entire Roof of Masonic Temple, Dallas, Texas, is coated with Karnak Aluminum Roof Coating

IN IMPORTANT CONSTRUCTION, *the* CHOICE FOR
WATERPROOFING • DAMPPROOFING
MASTIC FLOORING • ROOFING
REFRIGERATION

KARNAK

LEWIS ASPHALT ENGINEERING CORP.

ASPHALT PRODUCTS

AND CONSULTING SERVICE

Since 1922, an organization dedicated to the protection of engineered construction from damage due to water and the elements. Our engineering staff of experienced specialists in this highly technical field is at your service.

ASPHALT KARNAK PRODUCTS TRADE MARK

LEWIS ASPHALT ENGINEERING CORP.
30 CHURCH ST., NEW YORK 7, N. Y.

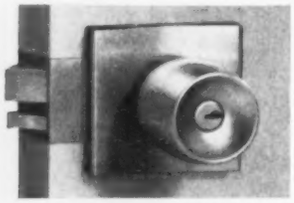
ASPHALT EMULSIONS • WOOD BLOCK MASTIC • ASPHALT PAINT • MASTIC FLOORING • DAMPPROOFING
ROOF COATINGS AND CEMENTS • PLASTER BOND • CORK FINISH • ASPHALT ALUMINUM COATINGS
PROTECTIVE COATINGS • WATERPROOFING ASPHALT • WATERPROOFING FABRIC • TILE CEMENT

Circle 137 for further information

classic designs in metals...

by russwin

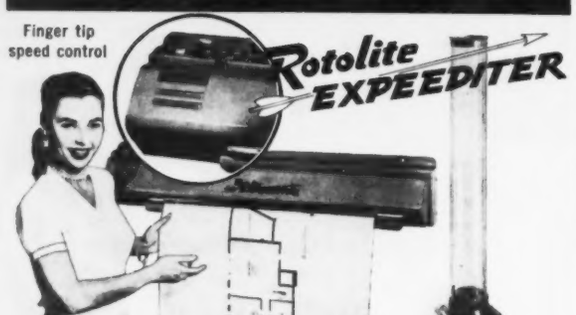
The Russwin Unity Design Uniloc — Handsomely contoured escutcheons and "hand-fitting" knob design distinguish this Russwin Uniloc. It is available in cast brass, bronze or aluminum . . . all standard finishes. No disassembly for installation. For details on complete line, write Russell & Erwin Division, The American Hardware Corporation, New Britain, Connecticut.



RUSSWIN

Circle 138 for further information

BETTER FAST WHITEPRINTER at LOWEST PRICE



FOR INDIVIDUAL OFFICE USE

Finger tip speed control for whiteprints, sepias and foils
Fastest Diazo Lamp on market
Priced below all other makes
Rotolite prices start at $129.50

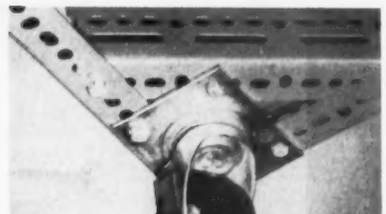
SEND THIS COUPON

ROTOLITE SALES CORP., Stirling, N. J.
Please send literature on Rotolite "Expediter"
Name .....
Concern .....
Address ..... City ..... State .....

Circle 139 for further information

PRODUCTS, EQUIPMENT, MATERIALS

and pressing in pull. No screwing or nailing is necessary.
AIA FILE NO. 27-B
MFR: LEHIGH BUILDING PRODUCTS DIV., AIR CONTROLS PRODUCTS, INC.
Circle 236 for further information



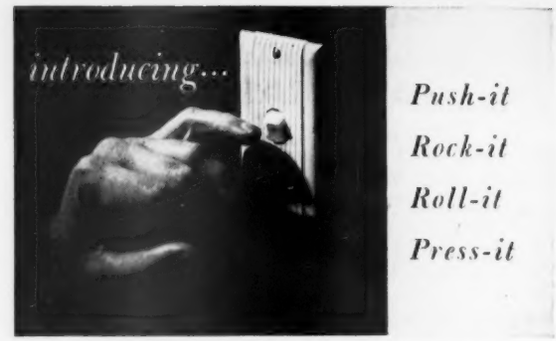
ADDITION TO CASTER LINE

MFR'S DESCRIPTION: series of 4" rubber-wheel casters.
USES: dollies, trolleys, shelf units.
SPECS/FEATURES: load-rated at 500 pounds, ball-bearing casters are available either swivel-type or fixed, and features adapting fixing-plate that permits speedy bolting to frameworks for low-cost mobile units.
AIA FILE NO. 27-C-1
MFR: DEXION INC.
Circle 237 for further information

MISCELLANY

METAL/ENAMEL CEILING PANEL

MFR'S DESCRIPTION: *Soundlock* is lightweight, non-breathing, metal lay-in ceiling panel.
USES: noise control.
SPECS/FEATURES: panels seal transmission and absorb sound in honeycomb cells adhered to solid steel back surface and perforated face surface. Cells are filled with fibrous glass. Textured, flat baked-on white enamel provides light reflecting surface and completely eliminates metallic lock associated with metal acoustical ceil-



THE ALL-NEW P&S® ROCKER-GLO SWITCH

. . . the switch that *looks* right, *feels* right and *is* right for every type of wiring job.

Here is the one switch with the most wanted features on the market today.
The merest touch causes instant, silent action . . . and Rocker-Glo glows in the dark.
Available in Despard and narrow rocker types.
Write for brochure, Dept. AE-106

P&S PASS & SEYMOUR, INC.
SYRACUSE 9, NEW YORK
60 E. 42nd St., New York 17, N.Y. 1440 N. Pulaski Rd., Chicago 51, Ill. In Canada: Renfrew Electric Co., Ltd., Toronto, Ontario

Circle 140 for further information

ELAFLOR*

STRONG, LIGHTWEIGHT, RIGID ELEVATED ALUMINUM FLOORING **FOR COMPUTER ROOM USE**

Panels of extruded aluminum construction feature strength and low weight. Combination of pedestals, special extruded aluminum stringers and lateral braces insures a firm and rigid substructure.

Cut-outs can be made anywhere that cable or duct passage is required. All panels easily removed for underfloor inspection and maintenance.

In standard modular units with the floor covering of your choice.

*Patented

WRITE FOR FREE LITERATURE AND SPECIFICATIONS
LISKEY ALUMINUM, INC.
Friendship International Airport, Box 506, Glen Burnie, Md.

Circle 141 for further information

PRODUCTS, EQUIPMENT, MATERIALS

ings. Soundlock is nominal 2′ x 4′ x 1″ panel, and special modules available up to 2′ x 6′. Mfr states that panels were specifically designed to eliminate annoying room-to-room transmission, especially noticeable in spaces with ceiling-high movable partitions. Construction employed makes it structural panel with approximately 480 individual sound absorbing and attenuating chambers in standard size panels. *Soundlock* has high sound absorption in addition to average sound transmission loss of 39.3 db. Mfr claims that installed cost of paneling is comparable to most other incombustible acoustical ceilings and because partitions may be supported by *Soundlock* and no sound attenuation baffles are necessary above movable partitions, it is far less costly than other types of installations.

AIA FILE NO. 39-B

MFR: THE KEMP CORP.

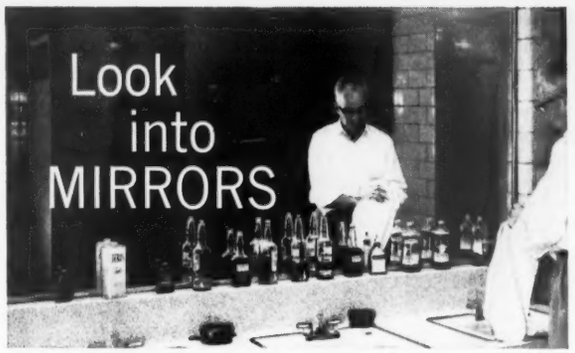
Circle 238 for further information

ALUMINUM FIRE ESCAPE LADDER

MFR'S DESCRIPTION: folding all aluminum ladder with appearance of two foot square aluminum down spout.

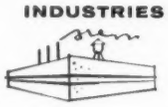
USES: residential and small commercial applications.

SPECS/FEATURES: opens to full width escape ladder at touch of button inside building, located near second or third story window with release inside. Treads are located so that it becomes easy matter for user to push button, open or break window and step onto solid ladder placed at right angle to building. Release button also



by Faries-McMeekan for

INDUSTRIES



RESIDENCES

INSTITUTIONS

If you have a question regarding mirrors or would like a copy of our latest catalog be sure to write today. We offer a complete selection of framed and unframed plate glass mirrors in standard and special sizes for walls, doors and other needs. In small quantities or large —for your mirror requirements call on:

Faries-McMeekan, Inc.

Write for catalog

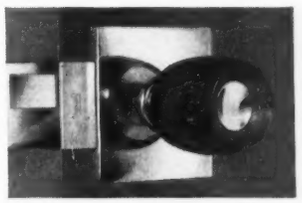
P. O. Box 35, Phone JAckson 2-8660, Elkhart, Ind.

Circle 142 for further information

exotic wood knobs for interiors...

by russwin

The Russwin Modera Design Uniloc with knobs of beautiful rosewood, cocobolo, walnut and ebony. Exceptionally durable woods are carefully selected for their beautiful coloring. For details on complete line, write Russell & Erwin Division, The American Hardware Corporation, New Britain, Connecticut.



RUSSWIN

Circle 143 for further information

Another fine specification for

PLASTER-WELD®

Luxurious 30 story

IMPERIAL HOUSE

New York's largest post-war apartment building

Here, at Imperial House, Emery Roth & Sons specified Plaster-Weld to bond finish plaster over all exposed concrete construction-slab ceilings, columns and beams.

After Plaster-Weld was sprayed on concrete, and had dried to a flexible film, plastering began, with Plaster-Weld creating a permanent bond between plaster and concrete. By eliminating rubbing and grinding of exposed concrete, Plaster-Weld helped provide a deluxe plaster finish at extremely low cost.

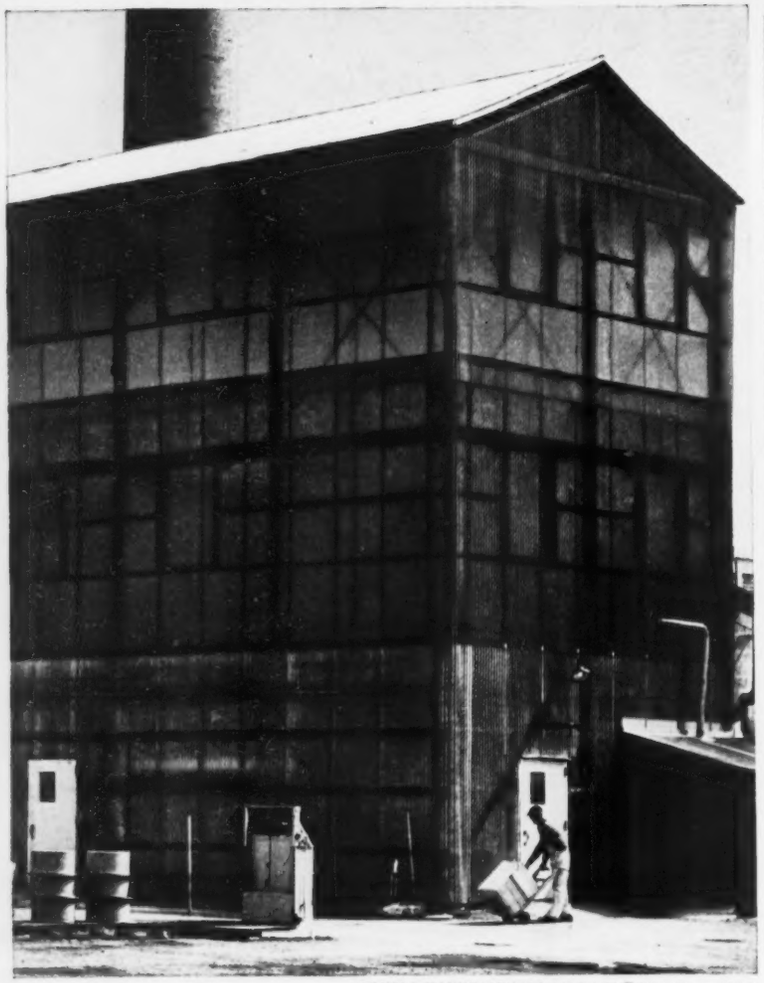
In case you haven't heard, Plaster-Weld is the amazingly versatile job-proven liquid bonding agent which bonds plaster to concrete . . . or any sound surface . . . for as little as 2c per square foot.

For complete technical information, see Sweet's, or write us direct. Address Box 5938-Z, Larsen Products Corporation, Bethesda 14, Md.

LARSEN PRODUCTS CORPORATION

LARSEN... FIRST... WITH THE FINEST IN BONDING AGENTS

Circle 144 for further information



PANELS MANUFACTURED BY FILON® PLASTICS CORP.

Acid-safe fire-safe translucent Hetron® panels enclose Kodak building

Those three points about fire-retardant Hetron panels made them a logical choice for Eastman Kodak Company's acid-still building when old siding had to be replaced.

Rigid, strong, meeting all building codes, these translucent fibrous-glass-reinforced panels never need painting. They reduce lighting loads, too.

How about *your* buildings? Do they need repair? Are you planning new ones?

Hetron-based panels have found a place in many industrial and commercial buildings. Shatterproof skylights on Brooklyn's huge Furman Street Pier. Geodesic dome structures on the DEW Line. False ceilings. Room dividers and many other uses. They come in a good many colors, too, for striking architectural effects.

If you would like more information on these fire-retardant panels, we suggest you write to Filon® Plastics Corporation, 333 North Van Ness Avenue, Hawthorne, California.

DUREZ PLASTICS DIVISION

9210 WALCK ROAD, NORTH TONAWANDA, N. Y.

HOOKER CHEMICAL CORPORATION

HOOKER CHEMICALS PLASTICS

Circle 145 for further information

PRODUCTS, EQUIPMENT, MATERIALS

placed at first floor level so that ladder can be released from that point and access gained from outside to upper room in case occupant panics. Burglar proof, weather proof, and structurally engineered with non-skid treads. Eligible for FHA Title I financing.

AIA FILE NO. 14-C

MFR: COOLMAN INDUSTRIES

Circle 239 for further information

ADDITION TO VAULT-DOOR LINE

MFR'S DESCRIPTION: stainless steel, non-grout vault door.

USES: financial institutions and fur and record storage vaults.

SPECS/FEATURES: door is equipped with pilot wheel operation. Stainless steel architrave can be furnished. Door is designed and manufactured to qualify for UL four hour label. When equipped with UL approved burglar alarm, it has same insurance rating as some sizes of bank doors.

AIA FILE NO. 18-G

MFR: SCHWAB SAFE CO.

Circle 240 for further information

AUTOMATIC CONVEYOR DISHWASHING MACHINE

MFR'S DESCRIPTION: single tank automatic conveyor dishwashing machine with all-welded cove and radius hood construction.

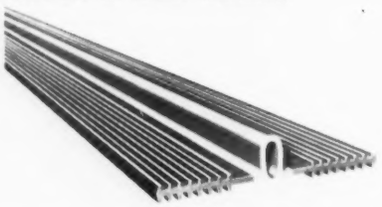
USES: commercial and institutional applications.

SPECS/FEATURES: *Admiral 120-5* will service up to 400 diners per meal. Internal castings are made of non-ferrous nickel alloy Ni-412 (R) that resists corrosive effects of strong detergents and repels foreign rust deposits. Interior includes stainless steel suction and discharge lines, tracks, scrap screens, spacers and spray pipes. Self-draining brackets and cornerless design eliminates bacteria corners. Provides for easy removal of interior parts and simplicity of cleaning offering a machine "as easy to clean as a kitchen sink" states mfr.

AIA FILE NO. 29-H-7

MFR: INSINGER MACHINE CO.

Circle 241 for further information



MULTIPLE-RIB WATERSTOP

MFR'S DESCRIPTION: *Sealtight DUO-PVC* waterstops are reported to be first waterstop designed to handle expansion correctly.

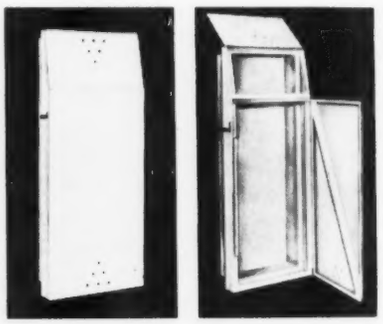
USES: waterstop in construction.

SPECS/FEATURES: waterstops are extruded simultaneously from two PVC compounds. PVC utilized in center area is compounded to combine strength with maximum flexibility, whereas, multiple-rib area is extruded from PVC compound that offers great strength with desirable rigidity. Expansion is accomplished with use of u-bulb center area design that will mechanically expand up to 1½" . . . if greater expansion occurs, *DUO-PVC* material will accommodate it safely. Rib design offers greater holding power, strength, and rigidity, according to mfr, who notes that rigid ribs will not shear-off, compress, or pull out.

AIA FILE NO. 7-A

MFR: W. R. MEADOWS, INC.

Circle 242 for further information



BUILT-IN CLOTHES HAMPER

MFR'S DESCRIPTION: space-saving hamper for wall or back of door.

USES: residenital and institutional applications.

SPECS/FEATURES: *Bilt-In* is stated to save two square feet of floor space and three square feet of tile or plaster. It offers 20 per cent more storage capacity than older models and yet maintains modern, slim-line appearance. Fully ventilated to prevent mildew. Rough opening size is 14" x 36". Available in baked white enamel finish, in special color to match major fixtures and appliances, or with prime coat.

AIA FILE NO. 29J

MFR: JENSEN INDUSTRIES

Circle 243 for further information

IMBEDDED CHIP VINYL FLOORING

MFR'S DESCRIPTION: vinyl flooring material that tends to conceal subfloor imperfections and provide luxury appearance for new homes at

reasonable price.
USES: residential and light commercial applications.
SPECS/FEATURES: *Patrician* is composed of random shaped vinyl and pearlescent accent chips surrounded by clear vinyl grout. It is made with moisture resistant backing and can be installed in basements and other below grade areas as well as on- and above-grade floors. Vinyl chips, similar in size and appearance to pearl stone chips used in fish bowls and flower vases are imbedded in transparent vinyl mortar, giving floor three dimensional effect. Because of imbedded chip composition, wearing surface is slightly embossed. Nubbly surface interrupts high gloss of plastic and tends to conceal imperfections in subfloor. *Patrician* is designed to sell for about 90¢ per square foot installed in most areas. Available in five patterns, white, rose taupe, ivory, celadon green, and multi-beige. Material is made in .070-inch gage in sheet form six feet wide.
AIA FILE NO. 23-G
MFR: ARMSTRONG CORK CO.
Circle 244 for further information

EPOXY FIBERGLASS WALL COVERING

MFR'S DESCRIPTION: continuous, tile-like wall material, *Armobond.*
USES: institutional, commercial, and industrial applications.
SPECS/FEATURES: engineered system of odorless epoxy protective surface coating designed for wall surfaces such as plaster, wood, metal, plastics, masonry, concrete, cinder block, cement block, wallboard, and particle board. It is durable and waterproof and resistant to abrasion and chemical corrosion, mfr claims. Full range of colors offered. One-half cost of tile and one-third cost of vitrified block. Approved by UL of Canada and Board of Standards for use in New York City.
AIA FILE NO. 24-D
MFR: DEERFIELD COATINGS, INC.
Circle 245 for further information

ASBESTOS-CEMENT SHEETS IN COLOR

MFR'S DESCRIPTION: decorative asbestos-cement sheets in pre-finished, permanently colored form.
USES: curtain wall, partitions, siding, roofing.
SPECS/FEATURES: available in 15 colors that will not yellow or fade and have excellent resistance to chalking when exposed to broad range of climactic conditions, mfr claims. Finish is corrosion-resistant and does not contribute to growth of mildew or fungi. Color-finished sheets are as easy to fit as ordinary asbestos-cement sheets. Finish is scratch and abrasion-resistant, and sheets can be

whether it is
AIR CONDITIONING
OR REFRIGERATION
look first to...

McQuay
AIRCON
AIR COOLED CONDENSERS

When water is a problem, look first to these popular Aircon air cooled condensers. Aircons are suitable for either refrigeration, air conditioning, or both. These heavy duty condensers are built to take it, and are available in horizontal as well as vertical air flow models where their low profile is often desirable. They are available in 13 sizes from 8 to 85 tons in a single unit. Multiple units, of course, enable any desired capacity to be attained, and you can always depend upon McQuay Aircons to do the job—the way you want it done.

Consult your local McQuay representative, or write McQuay, Inc., 1669 Broadway St. N. E., Minneapolis 13, Minnesota.

rigid, heavy gauge construction for durability and low noise level

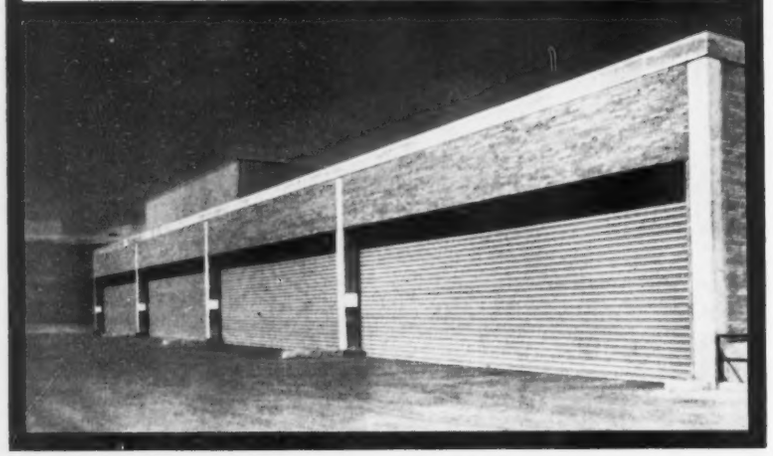
McQuay INC.
AIR CONDITIONING • HEATING • REFRIGERATION

Circle 146 for further information

now

MAHON ADDS A NEW DIMENSION TO ROLLING STEEL DOORS

...7-INCH WIDE SLATS FOR HEAVY-DUTY USE



Newest addition to the family of Rolling Doors from Mahon is a curtain design that fills a real need in many door applications. It uses 7-inch-wide interlocking slats of heavy (16- or 14-gage) Bonderized steel to provide *extra-long life in hard and constant usage.* These new Mahon Rolling Steel Doors have been proven-in-use to be economically and functionally ideal for industrial plants, railroad, truck and maritime warehouses and similar installations, particularly involving extra-wide door openings. Shown: Four of the new Mahon Doors—these are 48′ 5″ x 15′ 6″ sizes. Write for information.

MAHON BUILDS A COMPLETE LINE OF ROLLING DOORS IN GALVANIZED OR STAINLESS STEEL, ALUMINUM OR BRONZE—MANUALLY, MECHANICALLY OR POWER-OPERATED MODELS IN STANDARD, UNDERWRITERS' LABELED, OR SPECIAL TYPES.

SEND FOR CATALOG G-60 OR SEE SWEET'S FILES

THE R. C. MAHON COMPANY *Detroit 34, Michigan*

MANUFACTURING PLANTS—Detroit, Michigan and Torrance, California
SALES-ENGINEERING OFFICES—Detroit, New York, Chicago, San Francisco and Torrance.
Representatives in all principal cities.

MAHON

Circle 147 for further information

PRODUCTS, EQUIPMENT, MATERIALS

power drilled and sawed without cracking or chipping surface. Finishes are not stained by such materials as ink, pencil, crayon, animal fats, mineral oils, greases, lipstick, coffee, tea, liquor, etc. Concentrated sodium hydroxide, saturated salt solutions, 10 per cent solutions of nitric, hydrochloric, and sulphuric acids have no ill effects on material. Color finish in no way lessons noncombustible character of asbestos-cement sheets because coatings are self-extinguishing.

AIA FILE NO. 23-L

MFR: KEASBEY & MATTISON CO.

Circle 246 for further information

WOOD/CONCRETE BONDING

MFR'S DESCRIPTION: adhesive material for rapid securing of wooden block flooring and wooden screeds to concrete slab floors and foundations.

USES: adhesive and bonding applications.

SPECS/FEATURES: *Bondite Asphalt Adhesive* enables builders to bond wood to concrete quickly and easily without fear of eventual disbonding, according to mfr. Available in five gallon pails, it may be applied at ambient temperatures from 45° to 105° F. and dries almost immediately. Wooden blocks may be laid and walked upon at once; and flooring may be nailed to screeds 30 minutes after application. In addition, material dries flexibly enough to allow for expansion and contraction during temperature changes, yet holds flooring and screeds firmly in place.

AIA FILE NO. 4-N

MFR: LION OIL CO., DIV., MONSANTO CHEMICAL CO.

Circle 247 for further information

ADDITION TO CONSTRUCTION SYSTEM

MFR'S DESCRIPTION: open steel plank added to slotted angle construction system.

USES: load-bearing floors, ramps, catwalks, stair-treads, mezzanines, and platforms.

SPECS/FEATURES: available in 4′ 6″ or 6″ lengths, each unit is 9″ wide, pressed from single slab of 16 gage mild steel. Single-bolt fixing plate makes assembly fast and simple. Finish is gray stove-enamel over phosphated steel. Galvanized finish is optional.

AIA FILE NO. 13

MFR: DEXION INC.

Circle 248 for further information

CV DURATHIN PANELWALL

Prefabricated, insulated, it provides a time-tested material for curtain-wall construction

Nominally 2" thick, the panel will be ⅜" CV Durathin bonded to Pittsburgh Corning Foamglas sandwich-type panel composed of 1¼" Foamglas faced on both sides with ⅛" cement-asbestos boards. The interior as well as the exterior surface can be faced with CV Durathin of color and finish selected by architect. CV Durathin Panelwall is available in modular sizes up to 4′ x 8′ in Federal Seaboard's virtually unlimited range of colors and textures. Added advantages that are always assured when you specify CV Durathin Panelwall include permanent colors, high quality and a uniformly glazed finish that retains its original beauty with minimum maintenance. Ease and speed of installation are other important features.

For complete data and color guide brochure, write today to:

FEDERAL SEABOARD TERRA COTTA CORPORATION

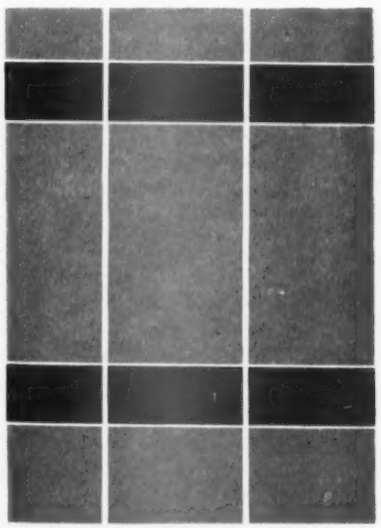
10 East 40th St., New York 16, N. Y.
Plant at Perth Amboy, New Jersey

F S T C

Circle 148 for further information

LITERATURE

Literature cited in this department is available from various manufacturers and associations free of charge, except where indicated. To obtain copies, circle the keyed numbers on the reader service cards facing pages 1 and 86.



SPANDREL GLASS PANELS

Details of *Vitrolux* spandrel glass panels in curtain wall construction are presented to architects and building planners in technical form in current manual. Booklet contains ten typical curtain wall installation details developed by architectural consultant and mfr's technical department. First five examples show custom-designed curtain walls derived from actual buildings, with last five examples of standard commercial systems typical of those available on the market. Minor changes have been made only to make all glazing details conform to recommended practice, to show additional types of back-up and building frame, and to maintain the mfr's anonymity. Both split mullion and structural mullion types of curtain walls are shown, as well as a combination of both. Fixed and operable sash are included, with examples of frames and mullions of extruded aluminum, carbon steel, stainless steel and bronze. Steel and reinforced concrete building frames are also illustrated, with various types of floor construction, fireproof back-up and insulation. In addition, there are sections covering glazing details and architectural data. Booklet has spiral binding which permits it to lie flat for study or use. (24 pp.) Copies available for ten cents by writing direct to: Advertising Department, 811 Madison Ave., Toledo 1, Ohio.

AIA FILE NO. 26-A-5

MFR: LIBBEY-OWENS-FORD GLASS CO.

Write manufacturer directly

CURTAIN WALL SYSTEMS

Catalog C-60, *Aluminum or Steel Curtain Wall Systems and Insulated Panels* now available. Illustrated catalog cites advantages and offers definitions of mfr's curtain wall systems. Included are insulated panel specification, horizontal and vertical systems, and heavy intermediate projected window walls, vertical and horizontal. (20 pp.)

AIA FILE NO. 17-A

MFR: WILLIAM BAYLEY CO.

Circle 300

PLASTIC SANDWICH PANELS

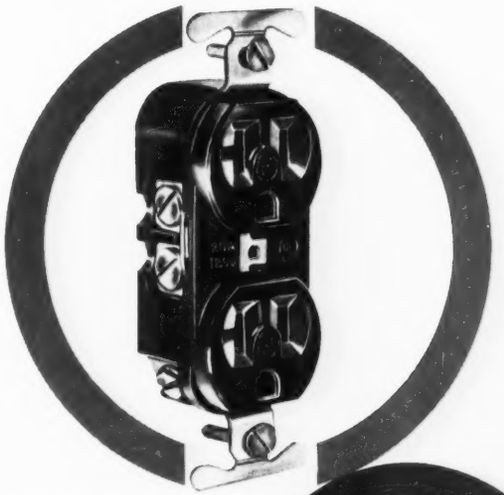
Series of one page bulletins describes variety of exterior and interior sand-

NEW

CIRCLE F

20-AMP

"U"-GROUND DEVICES



. . . Section 220-3 (b) of the 1959 National Electrical Code states . . .

"For the small appliance load in kitchen, laundry, pantry, dining room and breakfast room of dwelling occupancies, (1) 2 or more 20-ampere branch circuits in addition to the branch circuits specified in paragraph 220-3 (a) shall be provided for all receptacle outlets (other than outlets for clocks) in these rooms, and such circuits shall have no other outlets."

Designed to provide full compliance with the revised Code, Circle F's *new* No. 2532 does much more! It becomes a "universal" outlet! It accommodates appliances, heavy-duty portable tools, business machines, etc., having substantial energy requirements, where the new 20 A.-125 V. plug cap (No. 2528) is necessary. It also accommodates 15 A.-125 V. 3 wire U-ground and standard parallel blade caps. One outlet for all! Circle F's quality is tops and the price is right. Contact your Circle F representative for complete details.

CIRCLE F MFG. CO.

TRENTON 4, NEW JERSEY

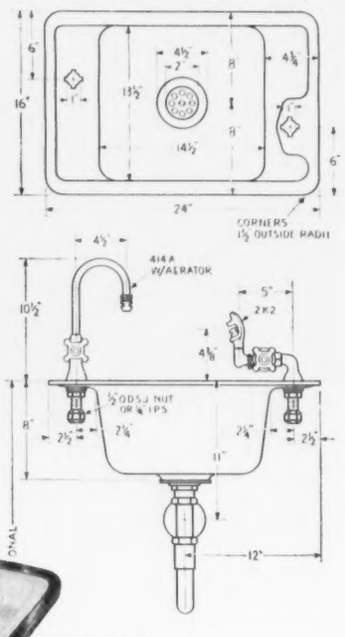
Circle 149 for further information

wich panels for curtain wall construction which utilize cores of impregnated fiber honeycombs and variety of other materials faced on both sides by secondary bonding with varieties of reinforced plastic sheets. Various decorative effects are achieved through variety of arrangements. In addition to recommended specifications, bulletins provide information on size, thickness, cell diameter, cell structure, face type, color, light, sound, heat, flammability, weatherability, and cost.
AIA FILE NO. 17-A
MFR: ARCHITECTURAL PLASTICS CORP.
Circle 301

WINDOWS & CURTAIN WALLS

Catalog No. *60* describes features and specifications for full line of aluminum custom windows and curtain walls. Included are reversible windows, double hung windows, single hung windows, overhead balance data, hardware and locks, stationary series, custom aluminum and aluminum curtain walls, aluminum double hung type, spandrel panels, and recommended glazing procedure. (36 pp.)
AIA FILE NO. 16-E
MFR: ADAMS AND WESTLAKE CO.
Circle 302

DECK TYPE FOUNTAIN "SPECS"?



Pat. No. 2,841,799

Whatever your specifications **HAWS** has the model you need!

Yes, HAWS provides Deck-Type Fountains for **every** classroom requirement. From small receptors to complete integral deck top units, HAWS meets your specs in three versatile materials: rugged enameled iron, 17 gauge stainless steel, and molded fiberglass in color! Equip them with virtually **any** combination of HAWS faucet and fountain fixtures for classroom service. See the full line in SWEET'S, or send for your free catalog. **Illustrated is Model 2450** in enameled iron.

HAWS DECK TYPE FOUNTAINS

A product of
HAWS DRINKING FAUCET COMPANY
Fourth and Page Streets
Berkeley 10, California

Since 1909 – Over 50 Years of Progress

Circle 150 for further information

ENAMELED PANELS

Porcelpanels, porcelain enamel on steel or aluminum are described in current bulletin *400*. Contents include discussions on panel types, extrusions and rolled shapes, grills, colors, finishes, textures, weather sealing, and installation service. There are sections on big panel construction, curtain wall remodeling, interior surfaces, louvers and sunshades, and illustrated table of eight representative panel types, methods of installing and specification forms for steel and aluminum panels. (8 pp.)
AIA FILE NO. 17-A
MFR: INGRAM-RICHARDSON MFG. CO.
Circle 303

COLOR GLASS PANELS

Thinlite curtain wall system catalog features color-in-the-glass units in both clear and prismatic glass tile panels. Also shown are recent improvements in details of system to facilitate and simplify erection and installation. Included are illustrations and descriptions of sizes, colors, and specification details of system. (12 pp.)
AIA FILE NO. 17-A
MFR: KIMBLE GLASS CO., SUBSIDIARY OWENS-ILLINOIS
Circle 304

PARTITIONS/PANELS

MOVABLE PARTITIONS

Movable partitions and paneling are now available in nine different color-coordinated finishes and are described in catalog No. *460*. Five wood-grain finishes and four pastel colors styled by American Color Trends are offered in stain-resistant, easily maintained, plastic-finished *Marlite*. This wide choice of finishes is stated to be well suited to conditions requiring the flexibility of movable partitions and the desirability of color-coordinated finishes to mix or match to individual likes or requirements. Movable partitions are available in solid panels, half-glazed or full glazed, and exclusive, patented system accommodates any elevation from as low as 42" to as high as 12'.
AIA FILE NO. 35-H-6
MFR: WORKWALL DIV., L. A. DARLING CO.
Circle 305

METAL LATHING

Value of varying dimensions of hollow partitions with channel studs is highlighted in latest revised technical bulletin No. 15, *Hollow Partitions with Channel Studs*. Bulletin gives details, specifications, limitations and, especially important, the economical, detailed uses of the assembly when unusual partition thicknesses are necessary to accommodate oversized or odd-sized building facilities. Bulletin points out that ¾" channel studs are a popular and practical means of solving certain partition problems. Utmost width-flexibility is allowed. This permits air ducts, piping, and mechanical lines to be enclosed within partitions. Three tables are included: Heights of Hollow Partitions; Types and Weights of Metal Lath; and Fire Resistive Ratings. Illustrations show details related to metal door frames, wood frames and metal casing bead, and wood frames with casing. Cross ties or spacers and stud anchorage are also illustrated. (4 pp.)
AIA FILE NO. 20-B1
ASSN: METAL LATH MANUFACTURERS ASSN.
Circle 306

POLYSTYRENE PANELS

Current booklet describes *Dylite*, expandable polystyrene and illustrates building uses of panels made with this material. Sections include: exterior wall panels, gable end panels, roof panels, exterior door panels, window panels, glass gable end panels, interior partition panels, modular design and planning, and panel construction showing use in 16 study houses. (36 pp.)
AIA FILE NO. 19-K
MFR: KOPPERS CO., INC.
Circle 307

ADDITION TO WALL PANELS

Fourteen *Arvinyl* wall panel color and pattern combinations have been introduced and are described and shown with swatches in chart-brochure. Panels, which consist of patterned vinyl bonded to either steel or aluminum, have applications for schools, hospitals, restaurants, and office buildings where a rugged yet highly decorative material is needed. Offered in formed or flat panels, material is mar-resistant, scuff proof, and easily maintained. Two of the patterns, textured vinyl, three are wood grains. Exclusive patterns, textures, or colors are available on special order. (2 pp.)
AIA FILE NO. 23-G
MFR: ARVIN INDUSTRIES, INC.
Circle 308

ALUMINUM

ALUMINUM SIDING

Comprehensive aluminum siding installation manual announced. Reference contains more than 100 illustrations and application instructions

LITERATURE

for products in line, including horizontal 8″ siding of both insulated and uninsulated types, and vertical siding. It also contains information on how to use accessories and how to achieve siding combinations and other special effects. In addition, general information on preparing tools necessary for an application, estimating job, ordering material, preparing the house and cutting siding panels are part of reference work. Cost is $1.00 from Barrett Div., Allied Chemical Corp., New York, N. Y.; Bird & Son, Inc., West Walpole, Mass.; Flintkote Co., New York, N. Y.; Mastic Corp., South Bend, Ind.; and Philip Carey Mfg. Co., Cincinnati, Ohio. (44 pp.)

AIA FILE NO. 12-C

MFR: ALUMINUM CO. OF AMERICA

Circle 309

ANODIZED ALUMINUM

Current booklet describes in detail *Kalcolor*, architectural anodic finishes. The 13 *Kalcolors* which include gold, tan, amber, olive, gray, and black, are reproduced in booklet as accurately as printing methods allow, mfr states. Design considerations, complete descriptions of anodizing system, and detail of four years of testing of new process, specifications, and architectural aluminum alloy properties also are included. (16 pp.)

AIA FILE NO. 15-J

MFR: KAISER ALUMINUM & CHEMICAL CORP.

Circle 310

DESIGN/PLANNING

SCHOOL DESIGN

Environment For Learning — A Research Study in Secondary School Design is name of booklet prepared by Goleman and Rolfe AIA, Architects and Engineers of Houston, Texas. Contents include chapters on: The Problem, The Comparison School, The Solution, Plans and Renderings, Engineering Considerations, Cost Comparison, and Conclusions. (22 pp.)

AIA FILE BLDG. TYPE 34

MFR: CARRIER CORP.

Circle 311

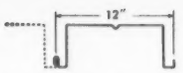
COMPUTER PROGRAM INDEX

Index of *G-15* civil engineering programs is available. Index contains extensive listing of applications prepared by *G-15* computer users, and submitted to Users' Exchange library at mfr's computer division, through the *G-15* Users' Exchange Organization. Programs in the following categories are also listed: traffic, surveying, earthwork, culverts and sewers, soils, interchange, bridges and piers, beams, columns, section properties,

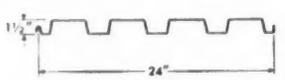
Circle 151 for further information →

When it comes to roof systems, INLAND covers everything!

A-DECK — For purlin spacings not exceeding 8'4". Narrow ribs provide deck surface that supports the thinnest or softest type of insulation.

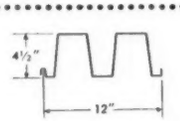


H-DECK — New! For simple spans from 10'0" to 20'0" — 3 and 4½" depths. Especially practical to cover walkways in shopping centers, schools, other installations.

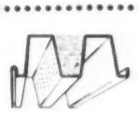


B-DECK — For spans to 10'0". Wide rib distributes metal for greater structural efficiency — gives higher section properties per pound of steel — well suited for use as side wall panels.

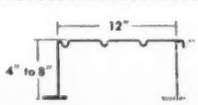
B-ACOUSTIDECK — Two in-one panel combines steel roof deck with acoustical ceiling having Noise-Reduction Coefficient of .70 — used for spans to 10'0".



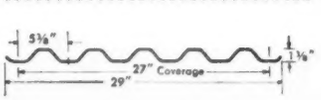
C-DECK—Carries normal roof loads over spans up to 24'0". Used extensively in canopies.



C-ACOUSTIDECK — Offers same Noise-Reduction Coefficient as B-Acoustideck. Can be used for spans to 24'0".



T-STEEL — New! Galvanized only — for clear spans to 32'0". Adaptable to acoustical and flush, luminous ceiling treatments. Provides superior diaphragm to transmit seismic and wind loads.



RIBFORM — High tensile galvanized steel form for concrete slabs over spans up to 8'0". Three types: Standard, Heavy-Duty, Super-Duty.

Whether your design calls for a dry insulation board roof or for wet-fill, there's an Inland roof system for the job — by the makers of famous Milcor steel building products.

Inland steel deck weighs less than half as much as poured-in-place or pre-cast construction. You can space joists wider and use lighter framework, to save both time and money. Panels are easy to handle and weld in place — in any weather that a man can work.

Types A, B, C, and H decks have the additional advantage of a Bonderized, baked-enamel prime finish that resists on-the-job damage. One field coat of paint on these Inland decks usually covers.

Write for catalogs 240, 241, and 245 — or see Sweet's sections 2c/Inl, 11a/In, and 2a/In.

member of the INLAND steel family

ENGINEERED PRODUCTS DIVISION

INLAND STEEL PRODUCTS COMPANY

Dept. J, 4137 West Burnham Street

Milwaukee 1, Wisconsin EP-1A

ATLANTA, BALTIMORE, BUFFALO, CHICAGO, CINCINNATI, CLEVELAND, DALLAS, DENVER, DETROIT, KANSAS CITY, LOS ANGELES, MILWAUKEE, MINNEAPOLIS, NEW ORLEANS, NEW YORK, ST. LOUIS

LITERATURE

miscellaneous analysis, and hydraulics.
AIA FILE NO. 35-H-4
MFR: BENDIX CORP.
Circle 312

ELEVATOR PLANNING

Facts and Counsel on Elevator Planning outlines advantages of independent, professional counsel in planning for elevators, escalators or other vertical transportation, and discusses in detail the various steps this consultant firm takes, from initial analysis to final check-out, to assure maximum return on elevator dollars. (12 pp.)
AIA FILE NO. 33
MFR: CHARLES W. LERCH & ASSOCIATES
Circle 313

OPTICAL LEVELING KIT

Publication is announced of *A New Approach to Leveling* which describes the components and operation of mfr's leveling kit. Booklet contains full data on industrial alignment problems and solutions, including foundation or bed leveling, profiling, differential leveling, and checking movement of equipment. It also provides product data on all component parts and available accessories such as tripods and related instrument supports. (8 pp.)
AIA FILE NO. 1-C
MFR: KEUFFEL & ESSER CO.
Circle 314

GOVERNMENT SERVICES

How to meet specification needs for furnishings of government services is the subject of current booklet. Spotlighting specialized equipment installation needs of municipal, county, state, federal, and military governmental levels, four-color booklet illustrates typical applications for office furniture, school and dormitory furniture, hospital furniture, reception and lounge furniture, industrial seating and storage equipment. Pictured are installations of these types using mfr's equipment in government service locations throughout the world. Booklet also includes brief description of special consultant design service to provide interior layout help on complimentary basis. (20 pp.)
AIA FILE NO. 28
MFR: ROYAL METAL MANUFACTURING CO.
Circle 315

PLASTICS

DECORATIVE LAMINATES

Technical data brochure for institutional, commercial and residential use of *Panelyte* high-pressure decorative laminate surfacing material. Contents include: Product Information—grades, colors and patterns, finishes, sizes, cost, availability, and fabrication; Physical Properties—characteristics and performance, NEMA test data, complete list applicable U.S. Government specifications; Application of *Panelyte* with suggested details—countertops and work surfaces, walls including tub and shower enclosures, doors—solid and hollow core, metal surfaces, window stools; and Specifications. (22 pp.)
AIA FILE NO. 19-K
MFR: ST. REGIS PAPER CO.
Circle 316

INSULATING BLOCKS

Full line of *Cellulite* expanded polystyrene insulating blocks now available and detailed in current brochure. Made of *Dylite* expandable polystyrene, Cellulite is available in regular or self-extinguishing forms. Information on this lightweight, durable material which provides excellent vapor barrier in large variety of building uses is featured in brochure along with data on insulation and other important properties; directions for use of product as insulation plaster base, as shingle backer, as cavity wall insulation, roof insulation, perimeter insulation (passes FHA requirements) and flotation applications; and recent addition to line, *Flexible Cellulite*, soft material easily formed to shape for packaging, packing, water tank insulation, or low-temperature pipeline wrapping. (6 pp.)
AIA FILE NO. 24
MFR: THE GILMAN BROTHERS CO.
Circle 317

INDUSTRIAL PLASTICS

Pocket-sized booklet compares outstanding properties and typical industrial applications of 13 major plastic families in common industrial use. Included are: acrylic; Implex; nylon; Teflon; polyethylene; flexible and rigid vinyl; cellulose acetate; butyrate; polystyrene; high and medium impact styrene; phenolic and fibrous glass reinforced polyesters and epoxies. Others are Mylar, ABS, and acetal. Five major misconceptions about plastics are corrected. Booklet summarizes material presented in mfr's educational program, *"Getting Acquainted With Plastics."* (6 pp.)
AIA FILE NO. 24
MFR: CADILLAC PLASTIC & CHEMICAL CO.
Circle 318

PLASTICS CATALOG

Catalog entitled *Plastic Stock Shapes, Molded and Fabricated Parts*, bulletin *AD-177*, announced. Included in bulletin are units manufactured from *Teflon, C.T.F.E., Delrin, Nylon*, and other resins. Photos and complete specifications are furnished for *Teflon T.F.E.* in sheets, cementable sheets, tapes, cementable tapes, extruded rods, extruded tubes, molded bars, molded cylinders, and filled and fusion-welded products; for *Chemiseal Nylon* in rods, slabs, films, sheets, tubes, and pressure tubes; for *C.T.F.E.* in discs, sheets, and rods; and for *Delrin* and *Teflon F.E.P.* in sheets, rods, and tubes. In addition, catalog provides photographic introduction to mfr's research and development, molding, extruding, and machining facilities. (16 pp.)
AIA FILE NO. 24
MFR: GARLOCK INC.
Circle 319

PLASTICS CATALOG

Revised catalog of plastic sheets, rods, tubes, films, blocks, and flat tubings as stocked by warehouse distributor. Cements, pigments, and miscellaneous supplies are also listed.

WEATHER STRIPPING BY ZERO

NEW ASTRAGAL IDEAS BY ZERO

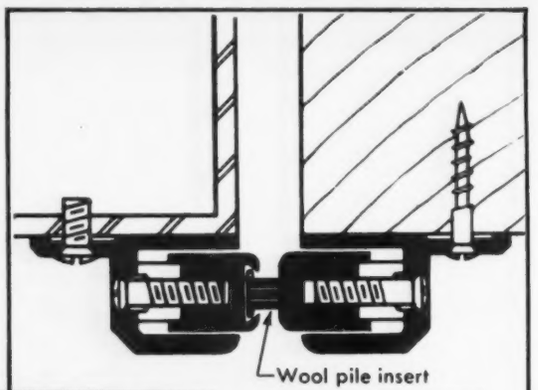
adjustable astragals for meeting stiles

Now available
1. With wool pile insert
2. In extruded aluminum or bronze

Also available in mortised and half-mortised types

- More positive weather seal with long-lasting wool pile insert. Insert is removable.
- Compensates for door expansion and contraction
- Operated by high-tempered springs

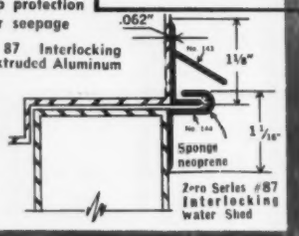
Zero adjustable astragals also available without wool pile.



Zero #155-M Surface Astragal (without wool—#55-M)

New door top protection against water seepage

Series No. 87 Interlocking Water Shed Extruded Aluminum for
- Out-opening doors in curtain-wall construction
- Out-opening metal doors with transoms



These new products, added to ZERO's complete line of saddles and weatherstripping, are shown in FULL SIZE detail in ZERO's NEW 28-Page Catalog. It's packed with important application data and many helpful suggestions.

Write for your copy today!

ZERO Weather Stripping for:
- Windows
- Doors
- Lightproofing
- Soundproofing
- Sliding Doors
- Saddles
- Saddles for Floor Hinged Doors

SEE OUR CATALOG IN SWEET'S

OR WRITE FOR COPY

19b-Zer

WEATHER STRIPPING BY ZERO

ZERO WEATHER STRIPPING CO., INC.
453 East 136th St. ● New York 54
Phone: LUdlow 5-3230

Circle 152 for further information

Catalog lists available sizes, weights, color ranges, textures, purchasing specifications, grades, and prices. Includes revised and expanded comparison table of chemical, electrical, and mechanical properties of 14 plastics families. *Cadco* nylon tubular bars are shown for the first time in price book. It is believed that this is the first distributor's catalog to show prices and specifications for linear or semi-rigid polyethylene sheets and rolls and similar data for *Delrin* acetal plastics. (64 pp.)

AIA FILE NO. 24

MFR: CADILLAC PLASTIC & CHEMICAL CO.

Circle 320

CEMENT/CONCRETE

RADIATION SHIELDING

Catalog *Section 400* covering high density concrete products used in the field of radiation protection. Complete data, descriptions, and specifications on available materials are presented. General information section includes material on precast blocks, slabs and special shapes, bulk aggregates, and on-site pouring assistance. (8 pp.)

AIA FILE NO. 35-E-3

MFR: RAY PROOF CORP.

Circle 321

CONCRETE FLOORS

Ability of *Masterplate Iron Clad* concrete floors to last six times longer than ordinary concrete floors is carefully detailed in bulletin No. *MP-4d*. Important features used in design of any heavily used industrial floor are covered. They include: wear and corrosion resistance, economy, spark resistance, static dissemination, color and non-slip, non-dusting, easily cleaned surfaces. Facilities where *Masterplate* concrete floors have been installed are shown with complete photographs, diagrams and thorough explanations of installation procedures. (24 pp.)

AIA FILE NO. 4-E-6

MFR: MASTER BUILDERS CO., DIV., AMERICAN-MARIETTA CO.

Circle 322

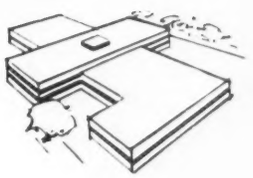
CEMENT ADMIXTURE

Current booklet describes *Triple Action Trimix*, admixture for concrete and mortar that accelerates hardening, increases early strength and reduces water requirements. Admixture is clear concentrated solution of set accelerating agents in combination with *Dynex*, surface active agent that reduces water requirements of concrete and mortar. *Trimix* is used in concrete, masonry mortar, maintenance work and manufacture of building units. Triple

PYROFILL* is the word for

poured gypsum roof decks

VERSATILITY



Here's versatility. A choice of seven USG® Formboards gives you complete control of the performance characteristics of a PYROFILL Roof Deck. You can specify varying degrees of sound control, insulation, fire protection, economy or ceiling beauty . . . in any combination . . . exactly where you want them—*even pinpoint them for different areas of the same building. See Sweets 2d/Un.*

*T. M. REG. U. S. PAT. OFF.

Responsibility for expert application of PYROFILL Gypsum Concrete is centered in a single U.S.G.-approved contractor—a roof deck specialist who is skilled and experienced in all phases of poured gypsum construction.

USG UNITED STATES GYPSUM

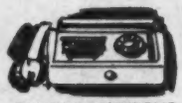
UNITED STATES GYPSUM / *the greatest name in building*

Circle 153 for further information

THE
WEAKEST LINK
IN YOUR CLIENT'S
CHAIN OF
COMMAND IS HIS
OUTSIDE
SWITCHBOARD

DuKane strengthens
your client's command with

PRIVATE AUTOMATIC
TELEPHONE SYSTEMS


FAMOUS FLEXIFONE
INTERCOMS

PAGING AND PUBLIC
ADDRESS SYSTEMS

INSPECTION CONTROL
SYSTEMS

TIME SIGNALS AND
BACKGROUND MUSIC

A good executive can reach any employee, any time, *right now* . . . not through an outside switchboard, but via modern *internal* communication systems. With DuKane's famed Flexifone intercom, private automatic telephones, public or pocket paging (and other electronic wonders) *the man your client wants is always there!* The chain of command is strong.

Dept. AEN110, DuKane Corporation
St. Charles, Illinois
Send me information on DuKane systems for strengthening internal communications.

Name _____
Please Print
Firm _____
Address _____
City & State _____

DuKane
CORPORATION

DuKane sound and communication systems are installed and serviced by a nation-wide network of more than 300 engineering distributors.

Circle 154 for further information

LITERATURE

action benefits described in booklet are stated to produce uniformly better concrete, in shorter time, at lower cost. Also discussed are uses of *Trimix* in integrated colored cement mixes, in stucco and parge coats, patching and maintenance, concrete products, reinforcement steel, and for dimensional stability and air entrainment in cement. (12 pp.)
AIA FILE NO. 3-B-2
MFR: SONNEBORN CHEMICAL AND REFINING CORP.
Circle 323

LIGHTING

COMMERCIAL LIGHTING

Booklet illustrating use of glass in several prominent lighting installations has been published and is offered to architects, engineers, contractors, and designers. Booklet contains series of full-page, four color photographs of lighting installations in eight commercial establishments across the nation. Information on lighting panels and fixtures is given along with advantages offered by these products. Architectural firms for each project are listed in *Glass—Integral Component of Quality Lighting.* (20 pp.)
AIA FILE NO. 31-F
MFR: CORNING GLASS WORKS
Circle 324

FLUORESCENT LAMPS

Bulletin *GEC-983P* contains tables of data and prices for full line of ballasts for fluorescent lamps. Publication describes applications and operating data for rapid start, instant start, preheat start, and trigger start ballasts. Information on ballasts for *Circline* lamps, outdoor applications, dimming, germicidal lamps, suppression of radio interference and home appliances is included. Bulletin also contains section on weatherproof ballasts as well as cross-section dimensions of ballasts, wiring diagrams, obsolescence table and installation and operating instructions.
AIA FILE NO. 31-F-21
MFR: GENERAL ELECTRIC
Circle 325

DOORS

PACKAGED ENTRANCES

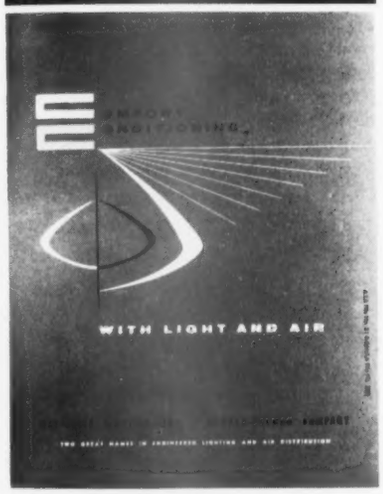
Current catalog includes full specifications on line of revolving doors and swing door entrances, and also announces line of balanced doors. Catalog *610* presents all safety features of revolving doors, complete details for installation, planning, and

specifications for use by specification writers. Typical standard arrangements are also shown. (20 pp.)
AIA FILE NO. 16-G
MFR: REVOLVING DOOR AND ENTRANCE DIV., INTERNATIONAL STEEL CO.
Circle 326

SLIDING GLASS DOORS

Complete line of series *150* stock-size aluminum sliding glass doors are described in catalog *SL-140*. Quarter-size detail drawings of two, three, and four panel doors are shown, along with typical installation details and architectural specifications. Standard 6'8" height doors are available for immediate delivery in single-glazed or double-glazed ⅝" insulating glass versions. (8 pp.)
AIA FILE NO. 16-N
MFR: ARCADIA METAL PRODUCTS
Circle 327

HVAC

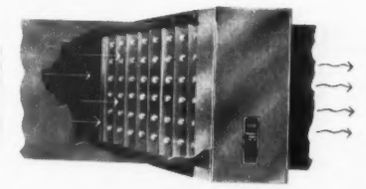


LIGHT/AIR DIFFUSERS

Complete information on combination light and air diffusers is contained in current catalog. Also presented is brief discussion of history and evolution of lighting and air distribution from kerosene lamp and pot bellied stove up to today's versatile combination light and air diffusers. Data for selecting and predicting performance, and drawings illustrating how combination diffusers are installed and balanced are included. (24 pp.)
AIA FILE 30-E
MFR: BARBER-COLMAN CO.
Circle 328

ATC UNITS AND DIFFUSERS

Detailed description of line of acoustic terminal control units for all-air high-velocity systems is contained in catalog *1060*. Full information and specifications on three ceiling models and two window/perimeter models are provided. Also contains engineering data on system noise and new tables of static-pressure losses and regains. (36 pp.)
AIA FILE NO. 30-J
MFR: CARNES CORP.
Circle 329



BLAST COIL HEATERS

Edition 9 of Bulletin E-97U — *Electric Blast Coil Space Heaters for Duct Installation* now available. Bulletin contains complete information on open coil duct heater that is easily installed in duct work, requires no floor space, wall space or flue, and has proven trouble-free and maintenance-free in many thousands of installations, mfr states. Stock sizes are shown from 1,000 to 30,000 watts (BTU/Hr. rating of 3,400 to 102,000). Custom sizes from 500 to 1,000,000 watts (BTU/Hr. rating of 1,700 to 3,412,000). (32 pp.)
AIA FILE NO. 31-K-3
MFR: INDUSTRIAL ENGINEERING & EQUIPMENT CO. (INDEECO)
Circle 330

UNIT VENTILATORS

Advantages of unit ventilators for schoolroom heating, cooling and ventilating are described in current, four-color brochure. In addition to sections dealing with unique product features, cost savings, engineering information, and ratings, brochure features fold-out spread illustrating unit ventilator operation through an exploded view of its components. Also described are matching unitized cabinets designed to complement unit ventilator in schoolroom, and several other elements of the system of schools, including convectors. *Walvectors*, cabinet unit heaters, and steam specialties. (14 pp.)
AIA FILE NO. 30-C-43
MFR: WARREN WEBSTER & CO., INC.
Circle 331

CLAY/BRICK APPLICATIONS

STRUCTURAL CLAY PRODUCTS

Glazed and unglazed tile and brick for interior and exterior applications in variety of industrial, commercial, and residential installations are described and illustrated in 1960 structural clay products brochure. Ceramic glazed *Vitritile*—structural facing product in 21 standard colors and nine accent colors—and many colored and textured facing bricks are highlighted for architects, builders, masonry contractors and others in four-color catalog. Bricks include: *SCR*, ceramic glazed velour textured, ceramic glazed *Vitribrick*, and speckled ceramic glazed in Norman and standard sizes. Other products featured in catalog *S-60* are *Tex Dri-Wall*, patio, stairtread, modular *Dri-Speedwall* and unglazed facing, *Uniwall* facing, flashing, *Speed-a-Backer*, loadbearing and partition drain, and *Fireproofer* tiles; glazed *Segmentile;* ceramic glazed window stool; *Tri-Filter* block underdrains; clay conduit, clay sewer pipe; wall coping; ceramic glazed handrail; ceramic glazed splayed base; and round and rectangular flue lining. (24 pp.)
AIA FILE NO. 10-A, 10-B
MFR: NATCO CORP.
Circle 332

RESIDENTIAL FACEBRICK

Brochure on use of facebrick in residential construction now available. Full-color photographs and drawings of wide range of actual and suggested uses of facebrick in residential construction are featured. Brochure also contains short specifications and architectural data and a quick estimating reference chart. Textures and colors are reproduced

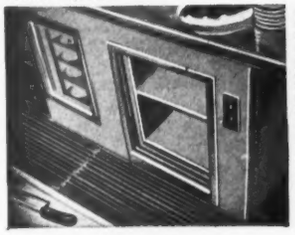
WHEN YOU SPECIFY dumbwaiters

Rota-Waiter (for two stops). Push-button call and dispatch from both levels.

...the name to remember is **Sedgwick**

Traction-type (for three or more stops). Push-button controls and signals at all levels.

Correspondence and Parcel Lift. For light loads and limited space.


Under-counter Rota-Waiter. Unique Sedgwick "Roto-Drive" prevents overtravel.

Sedgwick manufactures a complete line of dumbwaiter equipment for all types of service, including — schools and institutions, hospitals and hotels, restaurants and offices, libraries, clubs and stores.

There are nine distinct types of Sedgwick dumbwaiters, each individually engineered and designed for capacities of 5, 25, 50, 100, 150, 200, 250, 300 or 500 pounds.

When you use Sedgwick engineering (based on experience since 1893) and specify Sedgwick equipment, your clients will be assured of dumbwaiters that exactly fit the needs and will give many years of safe, dependable and trouble-free service.

Other Sedgwick Products

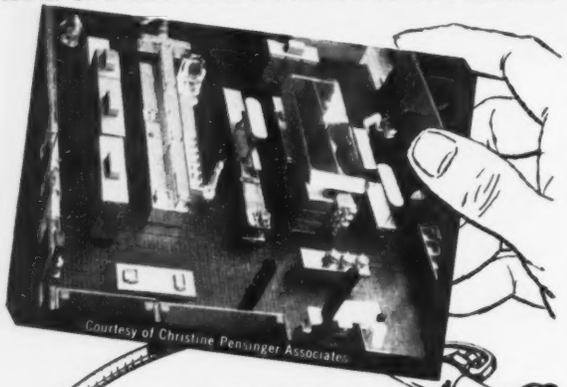
★ SIDEWALK ELEVATORS
★ FREIGHT WAITERS
★ RESIDENCE ELEVATORS
★ "STAIR-TRAVELORS"

See standard specifications and layouts in SWEETS 24a/Se

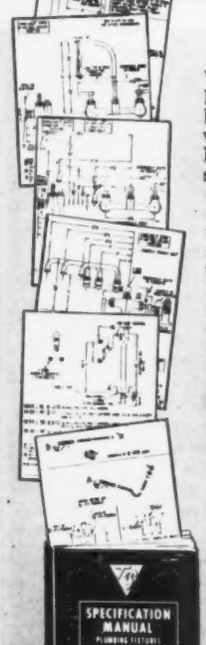
Sedgwick MACHINE WORKS
289 West 14th Street, New York 11, N. Y.
☐ Please send general information
☐ Please send specific recommendation
on: _____
_____
NAME _____
ADDRESS _____
CITY _____ STATE _____

Circle 155 for further information

from one end of the kitchen to the other..



PLAN A COMPLETE
WATER SERVICE SYSTEM with
Stream-Mated
WATER FIXTURES
more sanitary, durable, trouble-free



When you pick the most practical layout for your new or remodeled kitchen, pick the most practical water fixtures to complement it. Leading food facility architects, specifying engineers, and plumbing contractors – the men who *know* – specify T&S quality-built fixtures to make that big difference in the smooth-operating efficiency of every type of kitchen, large or small. Heavy duty construction, finest materials, precision engineering, quality control, guaranteed satisfaction...all these are plus features you get with every T&S unit at no premium in cost. Insist on a complete T&S *stream-mated* system for integrated water service on a par with the kitchen you have planned.

T&S SPECIFICATION MANUAL
FREE to kitchen planners!

This complete T&S manual of plumbing fixtures and specialties helps you design an entire kitchen layout for most efficient water service. It contains full specifications and roughing data of water units for every purpose to save time, steps and money in your planning. Write or call today for your personal, registered copy.

See your dealer or write for Product Bulletins on:
PRE-RINSE • GLASS FILLERS • WATER STATIONS • FAUCETS
PEDAL VALVES AND SERVICE FITTINGS • POT FILLERS
KETTLE KADDIES • SPRAY HOSES • ACCESSORIES
LAB-FLO LABORATORY SERVICE FIXTURES

T&S BRASS & BRONZE WORKS, INC.
128 MAGNOLIA AVE., WESTBURY, L.I., N.Y.
Telephone: EDgewood 4-5104

Circle 156 for further information

LITERATURE

for varieties of facebrick. (4 pp.)
AIA FILE NO. 3-F-1
MFR: PACIFIC NORTHWEST DIV., GLADDING, McBEAN & CO.
Circle 333

ELECTRICAL APPLICATIONS

WIRING DEVICES

Condulets for Corrosive Locations is title of currently re-issued bulletin with supplemental information. Corrosive substances are listed in tabular form with appropriate corrosion-resistant metals and finishes used in condulets. Booklet also contains brief descriptions of metals and finishes, and includes listings of *Plast-A-Coat* condulets for hazardous and non-hazardous locations. (20 pp.)
AIA FILE NO. 31-C-71
MFR: CROUSE-HINDS CO.
Circle 334

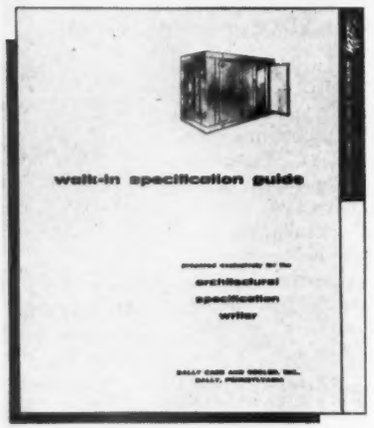
ALL-STEEL RACEWAY

Complete engineering data on *Plugmold 2100* all-steel raceway is now available. Folder includes revised wire capacity for raceway recently approved by UL. *Plugmold 2100*, two-piece system of .040" steel, is designed to be used as surface wiring raceway, multi-outlet system, or tele-power system. Illustrated folder contains installation instructions and technical information on devices and fittings. (4 pp.)
AIA FILE NO. 31-C-62
MFR: WIREMOLD CO.
Circle 335

STORED ENERGY SWITCHGEAR

Current bulletin, *2801-2A*, describes in detail completely redesigned line of 4160-volt metal-clad switchgear—stated to be the most compact in electrical industry. Two-color bulletin gives comprehensive information on complete line of indoor and outdoor—both minimum depth and walk-in type—equipment which is available in ratings through 3000 amperes continuous current and 250 mva interrupting capacities. Construction and performance features, ratings and dimensions are furnished. Bulletin is illustrated with photos, sketches, diagrams, and drawings and includes charts and tables for detail engineering information. Separate sections provide drawings, dimensions, preferred locations, and arrangements of various circuit elements for indoor and outdoor type equipment, respectively. Panel layouts and dimensions for standardized units are provided in two-page layout. (20 pp.)
AIA FILE NO. 31-D-4
MFR: I-T-E CIRCUIT BREAKER CO.
Circle 336

FOOD SERVICE FACILITIES



WALK-IN COOLERS/FREEZERS

Walk-in Specification Guide is prepared especially for architects involved in the design of food storage and serving facilities. Types and sizes of coolers and freezers and complete specifications are presented.
AIA FILE NO. 35-C
MFR: BALLY CASE AND COOLER, INC.
Circle 337

DISH HANDLING SYSTEMS

Bulletin *No. 120* identifies and qualifies products in mfr's line, with sufficient data to indicate type of equipment available with general specifications on its adaptability and use. General specifications on *Traylifts* and *Traybelts* are offered for preliminary discussion as indicated on specification chart and in various tables of data throughout bulletin. Covered are mechanized dish handling systems for hospitals, schools, hotels, cafeterias, clubs, etc. (12 pp.)
AIA FILE NO. 35-C-13
MFR: STANDARD CONVEYOR CO.
Circle 338

MISCELLANY

ANTI-GLARE COATINGS

Products catalog describes how *Fence-Bond* paint, applied directly on rust, stops rust action and provides complete one-coat protection of chain-link fence. Catalog also gives details about other products in mfr's line: (1) *No-Glare* coating for window glass, which filters out sun glare while allowing 94 per cent of natural light to enter; (2) aluminum roof coating, which reduces summer heat in buildings as much as 20 per cent; (3) heat-resisting aluminum and black paints, for protection on interior and exterior hot surfaces; (4) acid and alkali-resisting alu-

minum or black paints, which provide durable, washable surfaces in corrosive areas; (5) utility Aluminum, an all-purpose indoor-outdoor paint; (6) rubber-base concrete floor enamel, which furnishes corrosion and abrasion resistant covering for floors; (7) glass cleaning crystals for factory windows and skylights. Prices are included for all products. (4 pp.)

AIA FILE NO. 15-E

MFR: SKYBRYTE CO.

Circle 339

COMPETITION WINNERS

Publication is announced of the complete brochure of the winners of the 1959 Architects Competition, *Better Living for the Middle Income Family.* Three color brochure includes winning entry designs in large-page reproductions. All details of site and buildings may be clearly read. In addition, brochure includes entries selected by jury panel "for publishing"—designs deemed of unusual interest and worthy of note for a particular theme or detail of presentation. Brochure further includes booklet which is an amplification of notes and schedules of published submissions.

AIA FILE BLDG. TYPE 14

MFR: MASTIC TILE DIV., RUBEROID CO.

Circle 340

New economies in control of rain from roof level to outfall
JM
JOHNS-MANVILLE
TRANSITE PIPE
STORM WATER
DRAINAGE SYSTEMS
A Non-Metallic, Corrosion Resistant Permanent Drainage System for Industrial Buildings, Manufacturing Plants - Other Structures With Large Roof Areas

STORM DRAINAGE

Benefits and economies of *Transite* pipe for storm water drainage and storm sewer systems are described in brochure *TR-252A*. Brochure contains detailed cost comparison that demonstrates how the economies in cost of pipe and fittings, labor, and excavation can mean saving up to 28 per cent in installation of *Transite* asbestos-cement storm water drainage system. Also included is description of material advantages of *Transite* for such service, such as long lengths, tight joints, low co-efficient of friction, strength, and corrosion resistance. Detailed illustrations show the installation of *Transite* from roof level to outfall, as well as underground and underfloor systems. Complete design data are included as to available pipe and couplings, fittings, and adaptors, as well as a guide for selection of pipe and sample specifications. (10 pp.)

AIA FILE NO. 29-C

MFR: JOHNS-MANVILLE CORP.

Circle 341

BATHROOM ACCESSORIES

Form *6464* describes line of solid forged brass bathroom accessories. Illustrations show all recessed and projection type accessories available. Three finishes are presented in color; *suncrest,* gleaming brass luster; *satin chrome;* and *bright chrome.* (4 pp.)

AIA FILE NO. 29-i

MFR: MIAMI CABINET DIV., PHILIP CAREY MFG. CO.

Circle 342

FIRE FIGHTING EQUIPMENT

Illustrated fire hose folder contains complete feature and specification data on approximately twelve different styles of fire hose furnished for protection of industrial plants, mines, business, institutional and public buildings. All information essential to correct fire hose selection is contained in Bulletin *S-230.* (4 pp.)

AIA FILE NO. 29-F-2

MFR: THE FYR-FYTER CO.

Circle 343

CLOCK-THERMOMETER LINE

Line of outdoor clocks and thermometers features ultra-thin casings for easy mounting and increased dial areas providing maximum visibility. Units have extremely modern reading dials, are made in sizes ranging from 15" to 48", and are cased in waether-proof aluminum and stainless steel. Metal case depth of flush-mounting units is only 15/16". Complete design specifications are published in *Bulletin A-24.* (10 pp.)

AIA FILE NOS. 31-i-23, 31-E-6

MFR: ELECTRIC TIME CO., INC.

Circle 344

GLASS FIBER

Technical data on properties of glass fiber are featured in current bulletin. Descriptions of product show performance data meeting requirements of MIL-C-17435 and MIL-C-7769 specifications. Applications of fiber glass are listed, particularly for use as package cushioning and for vibration damping. Application to machine base mounts, acoustical isolation, and molded insulation are also discussed. Fields of use include construction,

NEW *Streamlined* STYLING

MODERN in color

MODERN in design

TAYLORed for you

These newly designed face-mounted models and semi-recessed types now make the Halsey Taylor line most complete! This re-styling adds a distinct touch of streamlined beauty to time-proved functional utility and supplements contemporary architectural planning. Write for catalog or see Sweet's.

The Halsey W. Taylor Co., Warren, Ohio

74

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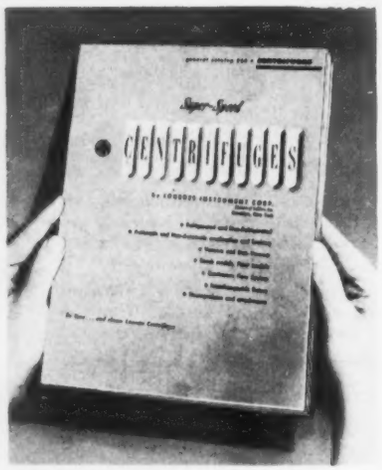
LITERATURE

ordnance, aviation, electronics, and mechanical devices. (4 pp.)
AIA FILE NO. 26-A-9
MFR: FIBROUS GLASS PRODUCTS, INC., DIV., PALL CORP.
Circle 345

FURRED CEILINGS

Revised bulletin, *No. 16*, on furred ceilings now available. Described as one of three basic types of ceilings involving metal lath and plaster, the assembly is made by attaching metal lath to steel channels, pencil rods, or furring strips which are in direct contact with overhead construction. These ceilings are used most on the underside of steel joists, junior steel beams, concrete or wood joists. One of the most important reasons for using furred ceilings is to give metal lath support at closer intervals than is available from the construction members themselves, according to the bulletin. Furring, the bulletin adds, usually improves fire resistance of a ceiling assembly and allows use or ornamentation that is impossible with some other types of ceilings. It also makes it possible to conceal unsightly structural details. (4 pp.)
AIA FILE NO. 20-B-1
ASSN: METAL LATH MANUFACTURERS ASSN.
Circle 346



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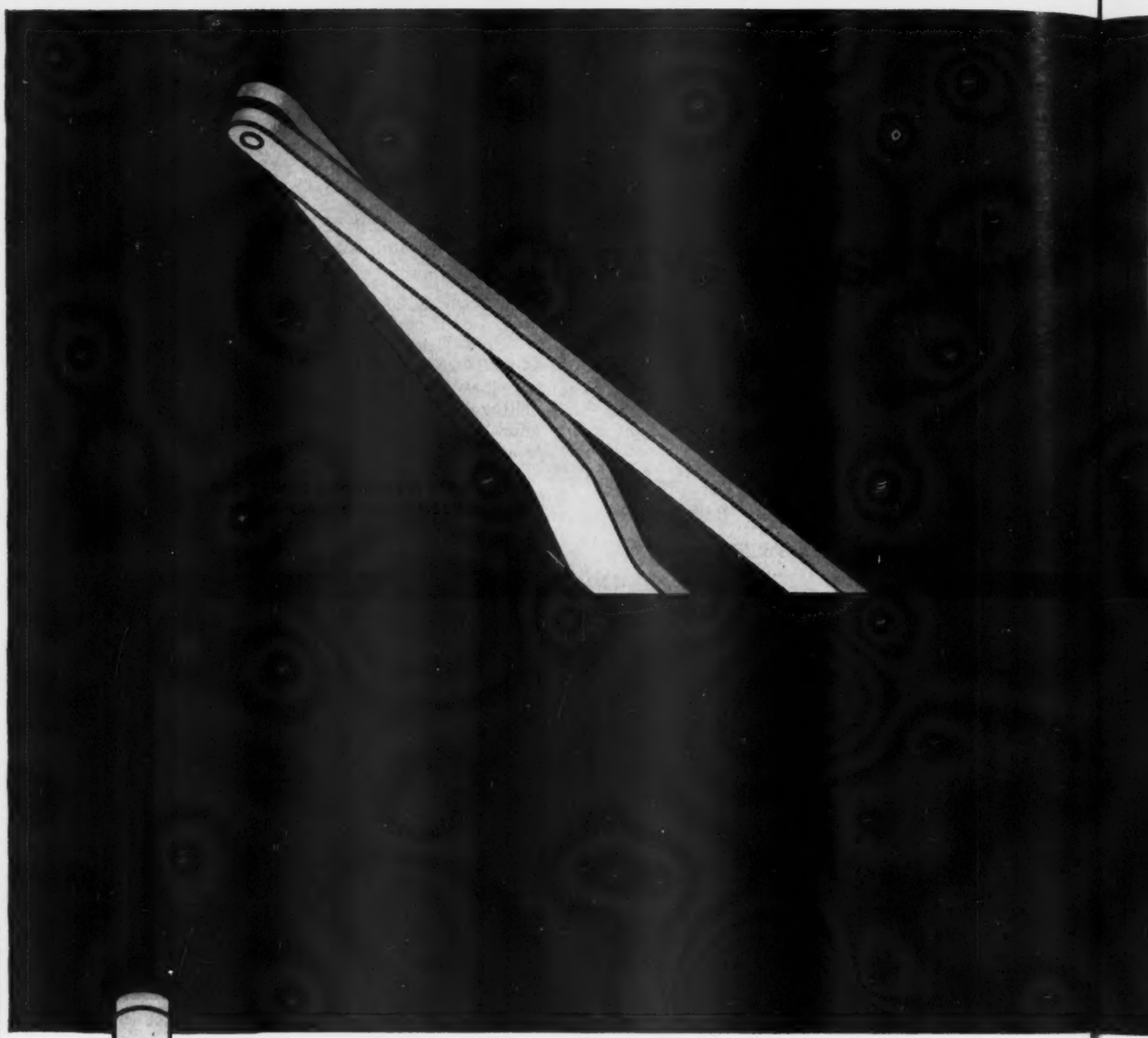

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LITERATURE

with large variety of interchangeably usable sealed containers with capacities from five ml. to two gallons. (16 pp.)
AIA FILE NO. 35-i-2
MFR: LOURDES INSTRUMENT CO., DIV., LABLINE, INC.
Circle 347

HOSPITAL SIGNALING SYSTEMS

Bulletin *137* presents guide to initial selection and planning of hospital signaling systems. Included in brochure are sections on: staff in and out register systems; staff visual paging system; visual nurses call systems; psycopathic nurses call system; manual audio visual nurses call systems; automatic audio visual nurses call system; push button automatic audio visual nurses call systems; device plate variations; stations: corridor lights, duty station annunciators, supervisory annunciators, and transformers; and nurses master stations and control equipment. (18 pp.)
AIA FILE NO. 31-i-41
MFR: S. H. COUCH, INC.
Circle 348

TIMBER DECKING

Publication is announced of full-color brochure giving description and specifications on *Unit Deck*, structural timber decking. Also included are specifications and description of *Clear-Panel* deck, custom product featuring kiln-dried western red cedar deck faced with permanent glued lamina of knot-free oak or birch. Information in folder includes standard patterns, assembly detail, how to estimate quantities, installation details and description of grades.
AIA FILE NO. 19-B-3
MFR: UNIT STRUCTURES, INC.
Circle 349

NEW CATALOG

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DOCUMENTS

The documents listed below are available through the associations and agencies cited. All requests should be directed accordingly.

American Society for Testing Materials. *1916 Race St., Philadelphia 3, Pa.*

Symposium on Durability and Weathering of Structural Sandwich Construction, *STP 270. Approx. 72 pp. $3.00.*

Adds to rather meagre published information concerning service performance of structural sandwich panels. Covers such topics as: effect of normal aging on strength of glass-fiber reinforced-plastic honeycomb cores; effect of natural environment on sandwich structure with AMS 3722 paper honeycomb-core; effect of environmental exposure on adhesive-bonded structures; temperature rise in structures due to solar heating; effect of climatic variations on polystyrene foam-core sandwich panels in roofs and walls; and experiences with structural sandwich in building construction.

Effect of Water-Reducing Admixtures and Set-retarding Admixtures on Properties of Concrete, *STP 266. Approx. 246 pp. $7.50.*

Consists of ten papers and a summary. Four of the papers represent the joint contribution of four principal producers of admixtures. Other papers were prepared by representatives of consumer interests, research organizations and the cement industry. Extensive tabular material, charts and references included.

ASTM Recommended Dimensional Standards for Prefabrication and Field Fabrication of Thermal Insulation Fitting Covers, *C 450, 1960. 168 pp. $5.00.*

Provides dimensional information necessary for the shop fabrication of insulation fittings for flanges, gate valves, globe valves, flanged ells and tees, weld ells and tees, and for dished heads and vessel sidewalls. Both high and low-temperature insulation fittings are included. Consists of schematic drawings and 162 tables.

Supplement to 1958 Compilation of ASTM Standards in Building Codes, *1960. 270 pp. $3.25.*

Calls attention to the revised standards and the new and revised tentatives, in the construction field, that have been accepted by ASTM since the appearance of the 1958 edition. For the 73 standards and tentatives where the revisions were not extensive, complete descriptions of the revisions are given. The revisions are so listed that the changes in the individual standards can be cut from the supplement and pasted in the standard which appears in the original book. In the case of the 27 standards and tentatives in which the revisions were rather extensive, the completely revised methods and specifications have been included. Also contains 13 new specifications for materials used in building construction.

1959 ASTM Proceedings, *Vol. 59, 1960. 1,424 pp. $12.00.*

Reports the technical accomplishments of the year of ASTM, including reports and papers, together with discussions, offered to the society during the year and accepted for the *Proceedings*. Contains 71 reports of technical committees, as well as 44 technical papers and discussions on subjects relating to research and standards for materials. An important adjunct is a subject and author index to all papers published in any form by the society in 1959.

Superintendent of Documents, *U. S. Government Printing Office, Washington 25, D. C.*

Conductive Flooring for Hospital Operating Rooms *by Thomas H. Boone, Francis L. Hermach, Edgar H. MacArthur and Rita M. McAuliff. National Bureau of Standards Monograph 11. 16 pp. $.20.*

Studies the characteristics and performance of conductive flooring materials as a primary factor in solving problem of hazard of static electricity in hospital operating rooms. Investigation indicated that physical, chemical, and serviceability characteristics of available types of conductive flooring are comparable with those of non-conductive flooring. Many of the results could apply to other locations where electrostatic hazards exist.

Clapp & Poliak, Inc., *341 Madison Ave., New York 17, N. Y.*

Techniques of Plant Maintenance & Engineering—1960. *341 pp. $10.00.*

A report of the Plant Maintenance & Engineering Conference held ear-

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lier in the year in Philadelphia. Contains 34 papers of the conference, along with the text of all discussions, comments and questions from the floor and answers from speakers and panel members. Covers maintenance problems of chemical plants, food processing plants, foundries, metalworking and metal fabricating plants, petroleum processing plants, pulp and paper mills, research development and pilot plants, rubber mills and rubber products plants, steel mills and textile mills.

American Standards Assn., *10 E. 40th St., New York 16, N. Y.*

American Standard Safety Code for Window Cleaners, *A39.1-1959. $1.00.*

The general purpose of the standard is to provide reasonable safety in window cleaning by the use of equipment with practical and adequate safety factors and features of safety, as well as for safe operation and maintenance. Designed to serve as a guide to architects and engineers, among others.

American Standard Time-Series Charts, *Y15.2-1960. $3.50.*

Newly revised ASA approved publication was published by American Society of Mechanical Engineers. Completely revised, supercedes 1938 edition. Emphasis throughout is on charts for presentation, covering three types: (1) types based on graphic form; (2) types based on scale arrangements; and (3) types based on special kind of scale.

American Standard Approval Requirements for Gas Water Heaters. *Volume I, Z21.10.1-1959. $2.00.*

Applies to all but side-arm type water heaters having input ratings less than 50,000 BTU per hour. Covers design, fabrication and performance requirements of the water heaters, for natural gas, manufactured and mixed gases, liquefied petroleum gases and LP gas-air mixtures.

American Standard Approval Requirements for Gas Water Heaters, Side-Arm Type, *Volume II, Z21.10.2-1959. $2.00.*

Applies to side-arm type heaters with input ratings less than 50,000 BTU per hour and designed for use with auxiliary storage systems for domestic service. Covers design, fabrication and performance requirements of the water heaters for natural gas, manufactured and mixed gases, liquefied petroleum gases and LP gas-air mixtures.

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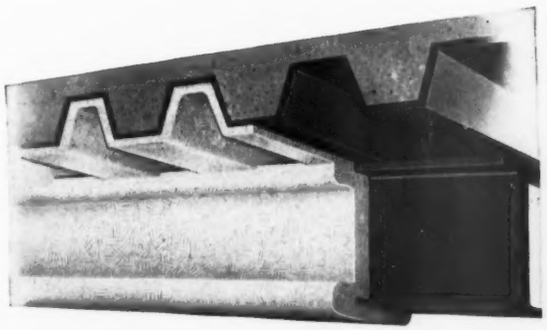

ITT Building, N.Y.C.
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Architects: Emery Roth & Sons, 400 Park Ave., N.Y.C.
Plastering Contractor: Morell-Brown, N.Y.C.

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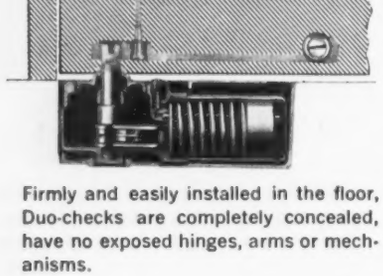

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BOOKS

Dow Building Cost Calculator. *An F. W. Dodge Corporation service, 119 West 40th Street, New York, N. Y. $32.00 first year. Renewals $25.00. 200-8½"x11" pages, supplied in index tabbed loose-leaf volume.*

This attractive and easy-to-use service gives the cubic foot costs for over 550 typical buildings ranging from simple beachfront cottages to multi-story structures. The service is in the process of being enlargened to include 650 or more building types. It is revised or supplemented quarterly. The information which it contains is applicable to 208 metropolitan areas in the United States and Canada. For a large number of selected cities, a local historical cost index series is included. The *Calculator* contains, in in addition, a General Appraisal Data section. Architects and engineers use the *Calculator* as an aid in preparing budget estimates and for reviewing general contractors bids. It is also used for making appraisals, determining real estate assessed values, calculating values for fire insurance coverage, estimating mortgage limits and several other uses. The *Cost Calculator* has come to be considered authoritative by the courts and by the professions both within and without the construction industry.

Five California Architects *by Esther McCoy, Reinhold Publishing Corp., New York, 1960. 200 pp. illus. $10.00.*

The inclusion of Irving Gill is academic; the exclusion of Neutra is annoying; (suggested re-titling — Five *Other* California Architects). The section on Maybeck is too devoted to the well-loved, well-known, and well-photographed Palace of Fine Arts, to the exclusion of so many of this giant's houses in Berkeley where they are still treasured even beyond tenure. This handsome book's best efforts deal with R. M. Schindler (contributed by Randell L. Makinson of U.S.C.) and the Brothers Greene. The latters' houses in Pasadena still do more for that town than the Rose Bowl any day of the year. *FPS*

Society of the Plastics Industry, Ind., Plastics Engineering Handbook, *Third Edition. New York: Reinhold Publishing Corp., 1960. 565 pp., illus. $15.00.*

The third edition of this book reflects the widespread changes in plastics

technology since the second edition came out in 1954. All the material has been revised and there are several new chapters. Cellular plastics, only mentioned briefly in earlier volumes, now has a sizable chapter of its own. The theory of viscous flow, applied to the extruding process, has necessitated a more complete treatment of extrusion and extrusion machines. Includes a new chapter on the fabrication of articles from thermoplastic sheets, and new material on the design of molded articles.

The Design of Shells; a practical approach *by Albin Chronowicz. New York: Frederick Ungar Publishing Co., 1959. 202 pp., illus. $8.50.*

films

Everyone's Express, *available through Visual Education Dept., General Electric Co., Schenectady 5, N. Y. 16mm., black and white with sound, 10 minute running time.*
The numerous benefits derived from coordinated metropolitan transportation are outlined. Shows examples of such planning in San Francisco, Toronto and Chicago.

The Master Builder, *available through McGraw Co., 51 E. 42nd St., New York, N. Y. 16mm., color with sound, 27 minute running time.*
Depicts the construction of a large industrial plant. Covers steps from ground breaking to mechanical installation and completion, of a vast aluminum producing plant in Ohio and a chemical refinery plant in Louisiana. Describes earth moving and site stabilization problems, steel erection, and general construction methods and procedures. A good portion of film is devoted to mechanical installation work and the completed production facilities.

The Amarlite Story *available on loan basis through American Art Metals Co., P.O. Box 7188, Sta. C, Atlanta 9, Ga. 16 mm., sound and color, 17 minutes running time.*
Reviews finishing, fabrication and installation of architectural aluminum. Concentrates on design, construction and remodeling of commercial buildings.

Electric Heating Goes to School *available through Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa. Full color, sound, 18 minutes running time.*
Aimed at architects, consulting engineers, and those involved in school planning, film depicts a typical school board's investigation leading to a choice of electric heat as most economical for proposed school.

THE NEED FOR MAKEUP AIR SYSTEMS

by George Reznor,
Vice-President, Engineering
Reznor Manufacturing Company
Mercer, Pennsylvania

This article on makeup air systems presents an authoritative discussion of why makeup air systems are needed, and how they may be applied to solve negative pressure problems.

Makeup air systems are of prime importance in any building with large exhaust requirements and no positive method of replacing the exhausted air. Such buildings may include mills, machine shops, chemical process plants, and even bakeries, dry cleaning shops, and restaurants.

In general, if building air is exhausted to remove fumes, smoke, odors, or contaminated or otherwise unwanted air, the air must be replaced. Lack of a makeup air system creates a problem of negative pressure in the building. The exhausted air is replaced by outdoor air infiltrating through openings in a building such as windows, doors, or cracks. Dirt filters into the building from outside, doors are difficult to open, air flow in flues may reverse, and health hazards could occur.

Physical discomfort particularly occurs in wintertime, when outdoor air is drawn into the building by negative presures inside. In addition, if the building's heating system has not been sized to cope with this problem, the heating system is overtaxed and its efficiency seriously impaired.

The problems encountered usually are the same whether we are considering a new or an existing building. The makeup air system itself varies in design only with the building operation, the severity of seasonal changes in temperature, and geographical location. For practical purposes, this article deals with systems operating summer and winter, and located in areas where design temperatures are below 35°F.

No two installations alike

Every building, or operation within a building, presents peculiar and individual problems which must be analyzed so that the need for makeup air is justified in comfort and safety for the individuals in it. The makeup air system also must be economically sound for the building operation.

Consider the problem of individual spaces within a building that require positive air exhaust.

Exhaust in these spaces often is required because a particular process creates undesirable heat or air contaminated by fumes, odors, or particulate matter. This situation requires the most critical analysis for proper solution, since an exhaust system may draw contaminated air from another space, possibly upsetting the production process, or even threatening employee health.

One example would be a wood-working facility located adjacent to finishing areas. An exhaust system usually is provided to remove dust created in the wood-working areas. The finishing areas also require exhausts for the paint sprays. If positive and clean makeup air is not provided to the paint area, contaminated air could be drawn from the adjacent areas, also upsetting the exhaust system in the wood-working area.

Another example would be where heated or air-conditioned offices are located within a large storage area such as a warehouse. If the warehouse area is exhausted, its fans will pull conditioned air from the office spaces, upsetting the heating or air conditioning system and creating other problems with the air distribution system.

Areas with furnaces also are usually supplied with large air exhaust systems, often resulting in as many as 20 air changes per hour. This, of course, creates a serious problem if no makeup air is supplied. The fans will draw replacement air from adjacent spaces, creating a problem when doors must be opened or closed. If the negative pressure is great enough, it may reverse the flow of gases in flues or chimneys. *(Continued on page 82.)*

THE NEED FOR MAKE-UP AIR SYSTEMS

(Continued from page 81)

Before any makeup air system is designed, careful analysis must be made not only of the amount of makeup air required, but also of the type of system to be installed, operation of the system, and how the system can best be adapted to the building's construction.

Sizing the installation

Sizing and selection of the equipment can vary with requirements, but generally, sizing is accomplished as follows:

1. *The amount of exhaust air must be determined.*
2. *Determine the amount of makeup air needed. This should always be slightly higher than the amount exhausted in order to maintain positive air pressure in the space. A figure of 110 per cent of exhausted air is generally considered.*
3. *Calculate the amount of tempering. The unit should be sized so that it is capable of producing a discharge air temperature a few degrees above room temperature. A maximum discharge temperature capability of from 75°F to 80°F suffices in general, although the actual discharge temperature will be governed by the requirements of the individual installation.*
4. *Compute the amount of heat required. This is the product of the amount of exhausted air in feet per minute (cfm), and the temperature difference between entering air and discharge air, times the factor of 1.085.*

Let us take, as an example, a room in which a small furnace is installed, and exhausting the heated air creates a negative air pressure.

Problem: The room is being exhausted at the rate of 10,000 cfm. Average room temperature is 75°F. Minimum outdoor air temperature is 0°F. Fan capacity of makeup air unit = 10,000 cfm × 1.10 = 11,000 cfm. Maximum makeup air temperature, T_1 = 80°F; Outdoor air temperature, T_2 = 0°F; Quantity of makeup air, Q = 11,000 cfm; Constant, K = 1.085; H, heat load for makeup air in Btuh = $Q \times K \times (T_1 - T_2)$; $H = 11{,}000 \times 1.085 \times (80 - 0) = 955{,}000$ Btuh.

Heat exchanger tempers air

The basic item of any makeup air system is an air handling unit with a heat exchanger to temper the air. The equipment from this point is refined to meet the particular requirements of the operation. The air handling circulates the air, while the heat exchanger tempers the air. If clean air is a requirement, filters can be added to the system.

Consideration then must be given to air distribution. Ductwork must be installed if the air handling unit is remotely located. Grilles of diffusers may be added to the ductwork to insure good air distribution. This is the point at which building construction must be considered. Space must be available for the equipment and ductwork.

The heat exchanger can be controlled to temper the air as required by indoor and outdoor conditions. Exhibit A is one method of accomplishing this.

A careful analysis should be made concerning the type of heat exchanger to be used. Consider the initial installation cost, including equipment, piping, ductwork, and the fuel available, as well as maintenance and operating costs. All of these items will vary with the type of building and location.

The heat exchanger could be a direct-fired gas device, or steam or hot water coils.

The choice of the type of heat exchanger will vary with the requirements of the system and the building construction. Generally, a gas-fired heat exchanger may prove less expensive to install and maintain than other types. It eliminates the need for insulated piping and related controls. Gas-fired heaters also can be installed where the makeup air installation is quite remote from an existing boiler or if the boiler already is taxed to capacity.

However, if steam or hot water piping is available and existing boilers are of the proper size, then steam or hot water coils may be used.

Types of systems vary

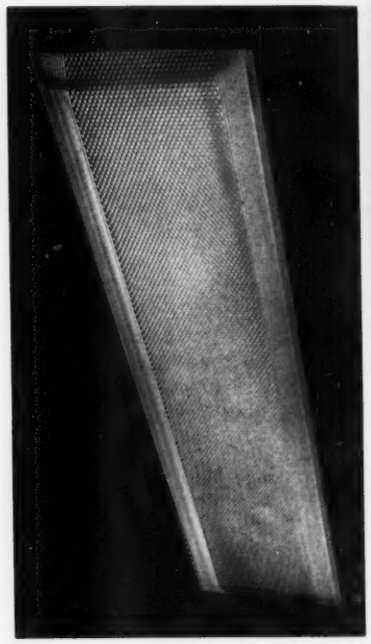
Another important factor to consider is the operating cost of the makeup air system. This cost depends entirely on the system control and its operation. Makeup air systems, as such, need operate only while exhaust fans are functioning. But in new buildings, the system may be designed for general heating as well as makeup air. This may be accomplished by control of the outdoor air introduced into the system through automatic dampers, which may be set to vary the amount of outdoor air taken in by the unit. If heating only is required, dampers will permit entrance of a minimum of outdoor air; when makeup air is needed, the dampers will permit entrance of maximum outdoor air. The outdoor air damper can be completely closed during unoccupied periods.

If a system is installed only for makeup air, it can be controlled to operate only when the exhaust system functions. Makeup air systems should also operate during summer as well as winter periods, providing filtered air cooling and ventilating in the summer. This is a benefit that buildings with exhaust systems only do not enjoy.

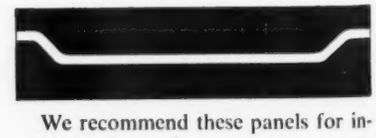
Operation cost of the makeup air system in the summer consists only of the power consumed in driving the fans. In the winter, the cost of fuel for tempering the air is added. In order to analyze this properly, consider the case of a building equipped only with an exhaust system. Infiltration of outdoor air adds to the cost of fuel consumption during cold months, since the existing heating system must overcome this heat loss to maintain temperatures in the spaces at a comfortable and healthful level.

By careful planning, with a makeup air system, the amount of additional fuel consumed in the winter may be controlled precisely to the point that it occurs only when desired or necessary. The benefits derived from the installation are well worth the investment.

Some architects, like the GREEKS, are partial to curves



If you have some large ceiling areas where monotony could be detrimental, here's a trick today's architects are borrowing from the classic Greek architects. Specify Corning Pattern No. 74, a crystal lens panel that introduces some interesting curves. This sectional drawing shows what we mean.



We recommend these panels for installation in conference rooms, executive offices and other places where high efficiency and low brightness alone aren't enough . . . where the subtlety of curvature adds just a touch of distinction. For complete data, write Lighting Sales Department, 8 Crystal Street, Corning, N. Y.

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THE ANATOMY OF A NEW PROJECT

PREVIEW:22

ADMINISTRATION BUILDING, COUNTY OF ALAMEDA | *project*
COUNTY OF ALAMEDA, OAKLAND, CALIFORNIA | *client*
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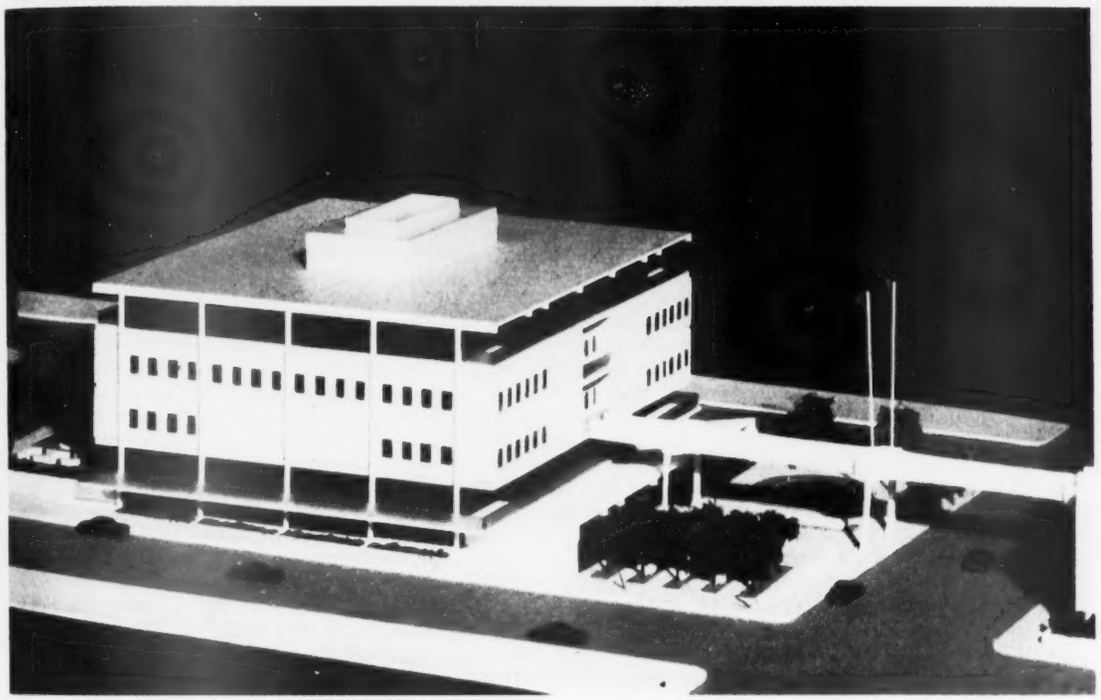

Descriptive summary of project

The County of Alameda Administration Building in Oakland, Calif. will be located across the street west from the existing courthouse and will contain approximately 4-½ acres of space for executive, fiscal, judicial and other departments. It will make possible the expansion of those county departments remaining in the parent building. Future expansion of up to one-third of the total area is planned within the building.

The main entrance on Oak St. is approached over a landscaped plaza in grand scale designed to enhance the dignity of both buildings. From this plaza more than 70 per cent of the public traffic into the building will never need to use either stairs or elevators. A second pedestrian entrance from Madison St., one floor higher due to the slope of the street, will make it possible for those going to upper floors to avoid peak load traffic on the main floor. The five-story structure will also contain a basement and a mechanical penthouse.

The two county buildings will be functionally united by a service and utility tunnel at the basement level, and, if additional funds become available, it will also connect at the second floor level with a footbridge crossing over Oak St. and the plaza.

Structural/construction notes

The structural system utilizes reinforced concrete columns and girders in a 30′ x 30′ nominal bay span with 12′ cantilevers on the east and west sides with pan joist slabs with 3″ concrete fill for electrification. The design of reinforced concrete will be expressed by exposed columns on the north and south walls. Elevators, stairs, restrooms and utility spaces are compactly grouped in an interior central core. In this way, the entire perimeter of each floor is available for departmental utilization.

The foundation will consist of individual footings under their respective columns since the present basement floor level is considered to not be under hydrostatic pressure.

Exterior materials

Walls and columns: monolithic concrete. Certain areas (1st, 3rd and 4th floors) to be faced with precast concrete finish panels of large size crushed granite aggregate exposed; *Fenestration and entrances:* stainless steel; *Railings and grills:* aluminum; *Flashing:* stainless steel; *Roofing:* 20-year bonded composition; certain special areas (roof of first floor where it projects at the main East entry) vinyl plastic; *Paving and exterior stairs:* concrete, with certain areas in cut granite block and other decorative materials; *Glazing:* ¼″ polished plate glass with certain special areas of heat absorbent type glass or double glazing.

HVAC

A. *Central water chilling and heating system:* The water chilling equipment will be located in the existing courthouse building. The water chillers will be sized at 60 per cent load, steam absorption, and 40 per cent load, electric driven. One chiller of each type will be installed. Pumps will be located near the chillers. Cooling towers will be located on the roof. Steam will be taken from existing boilers to operate the absorption type water chilling unit. The water heating equipment will be located in the existing courthouse building. Steam will be taken from the existing boilers to two converters located near the water chillers. Pumps and expansion tanks will be located near the converters.

B. *Piping distribution system:* The hot and chilled water will be circulated through a piping system going through the new tunnel to the new courthouse building. Piping will then rise up in a shaft space for distribution to the fan rooms.

C. *Controls for water-circulation system:* All operation of equipment will be automatic except that the selection of chilling or heating water will be manually controlled from a central master control panel. Water service to fan rooms will be automatically controlled from outside air temperature.

D. *Central air-conditioning system:* The air handling equipment will be located on each floor of the new building and will be a central type medium pressure system. Outside air will be forced down a shaft from the roof for distribution to the fan rooms as required. A pressure relief fan located on the roof will exhaust air from the spaces as the amount of outside air increases.

E. *Air-distribution system:* The air system will be a double duct medium velocity type with mixing boxes to low pressure distribution ducts and ceiling type outlets. The return air will be either exhausted to the pressure relief fan or returned for distribution. Heating or cooling coils will condition the air to the spaces as required. All air will be filtered before entering occupied spaces.

F. *Controls for air distribution system:* The air temperature in the ducts will be controlled by regulating the water supply to the coils with reset controlled by outside air temperature. The mixing boxes will be controlled by zone thermostats in the conditioned spaces. The per cent of fresh air supply will be controlled by outside air temperature. Fan operation will be by time clock control from the main control panel. All operation of the air system will be automatic.

Electrical work

A. *Main electrical service:* Electric service will be brought from power company 12 KV underground primary lines to any underground customer owned transformer vault. The power company will furnish transformers for the vault to reduce the voltage to 265/460 volt, three-phase, four-wire wye. A 4,000-ampere, four-pole, full neutral, low impedence bus duct will transmit secondary power from the transformer vault to the main switchboard which will consist of power air circuit breakers.

B. *Underfloor duct system:* A complete underfloor duct system composed of rectangular steel ducts 1-⅜″ high by 6½″ wide and floor junction boxes will be installed on each floor of the building. Duct system will provide electric and telephone facilities at desk located from service fittings.

C. *Other systems:* there will be a complete raceway system for installation of telephone facilities, in addition to a fire alarm system, a clock systems and a closed circuit TV and sound system.

Costs and areas

Area (building construction)	186,000 sq. ft.
Estimated cost	$4,190,000
Estimated unit cost factor/sq. ft.	$22.53

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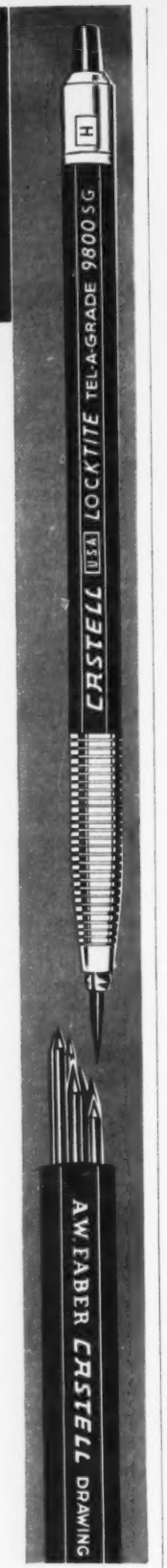

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EDITORIAL

SOME FRAGMENTS

EVERYONE'S EXPRESS: is a new, ten-minute, 16 mm. film documentary that uses San Francisco's proposed transportation plan as an example of how ever-increasing traffic congestion can be relieved by a coordinated metropolitan transportation system. It points up that the obvious solution to traffic jams is to find a faster, more efficient way to move *people*, not cars. The answer, according to the film's producers, lies in utilizing a system that uses cars and buses to their best advantage and economical rail rapid transit as the high-volume trunkline carrier. The movie shows how three cities are making this a reality: *San Francisco:* this city's plan is considered feasible right now by the use of a 75-mile-an-hour electric train on exclusive rights-of-way which would provide a modern, attractive, and comfortable means of transportation—a seat for every passenger. The trains would depart every 90 seconds during rush hours from conveniently located stations which would also have parking facilities. *Toronto:* This Canadian metropolis of 1,500,000 has demonstrated that realty values have increased in excess of the fixed charges of its new rapid-transit system by more than one-third within three years after the system was installed. *Chicago:* Here the center mall rapid transit lines can economically carry up to 40,000 passengers an hour, while the most a freeway lane can handle is about 2,000 people in autos or 3,000 people, economically, in buses. This film should prove to be of interest to architects and urban planners. Arrangements to borrow or buy the film may be made by contacting the nearest *General Electric* Apparatus Sales Office.

CURTAIN WALL INDUSTRY: The nation's curtain wall industry in 1965 will have a sales potential of $376,000,000, of which one-third, alone, will apply in the thirteen western states, it was forecast by D. B. McFarland, president of Pacific Curtainwall, Inc. Based on an extensive survey made for this manufacturer, the figures were said to include only the pre-fabricated metal-frame type of curtain wall and do not include other types of non-bearing walls such as metal siding, brick veneer, pre-cast concrete, etc. McFarland stated that to realize this growth, the curtain wall industry must make a concerted effort to adapt itself to the requirements of architects.

Starting with an authoritative estimate that all building costs will reach a total of 65 billion dollars in 1964, the survey developed the following formula to arrive at the curtain wall potentials:

From 6% to 10% of over-all building costs go into exterior walls; half of this, or from 3% to 5% goes into non-bearing exterior walls; "X" factors, based on the manufacturer's experience, were used to estimate the percentage that "curtain" will take of the non-bearing wall business in each building category. Interestingly enough, the new residential category was slated to be the target of curtain wall development—the estimated market for this area was given as $15 million. The dominant classification was the commercial group for an anticipated market of $110 million in 1965.

GUGGENHEIM REVISITED: Upon the occasion of the opening of the Solomon R. Guggenheim Museum, over a year ago, we delivered our comments on that most worthy work of the late Frank Lloyd Wright. At that time, we borrowed from George Bernard Shaw and termed this structure, "a temple for the ascent of man." Since that time, we have had ample opportunity to make numerous visits whereby first impressions were reviewed and examined for validity. We have also listened to and read the opinions of many others—among them a freelance writer for a nationally-circulated slick who recently dished up a few tired and confused shibboleths about Wright's design for the Guggenheim. By now, most of the hue and cry has subsided, the museum is an immense success, and we have found time to note our satisfaction with our original observation—that this provocative building by Wright is still a Promethean, life-giving force to the *historical* concept of a museum. Wright fully recognized that the museum structure, as we have come to accept it, was a remodelled adaptation of the princely European estate with its salons, galleries, and various architecturally-related forms and conceits. The *Louvre*, the *Hermitage*, the *Prado*, the *Uffizzi*,—all these palaces of the *ancien regime* were given over to housing collections of works of art. The resultant prestige of social acceptability and cultural authority associated with these institutions, encouraged imitation in many countries, including our own, of museum buildings which were assiduous copies in architectural character, planning and structure of these extant historical examples.

Therefore, we restate, that Wright freed the museum building from historical convention and restored the word "museum" to its classical meaning—a 'temple of the Muses.' To us, he has produced a *living experience* in the visual arts and spatial forms that may be enjoyed by even the most uninitiated. To the galley-viewer, the entire interior of the building presents a continuously-unfolding world of visual excitement—wherein the paintings and sculpture are experienced at close-range, in perspective, or in several tiers of form, color and plastic imagery. The great paintings and sculpture of the modernists are seen at great advantage. The poor and questionable work of the modernists, in this museum environment, just wither and die on the vine, so to speak. Perhaps, Wright's structure reveals the inner-life of the art it contains—either for its aesthetic richness or its absolute poverty or triteness. Succeeding generations may best judge the relationship between building and its contents.

The Guggenheim collection has always been considered unorthodox. Ironically, this time the collection itself has been "topped" by its own unorthodox building by a most unorthodox architect.

Again, in passing, may we state that Wright has left a part of his rich legacy for the enjoyment of millions of New Yorkers. He has spoken in a clear and beautiful idiom—rich, bold, and vibrant with life. *JJC*

NAMES

NORMAN P. MASON U.S. Housing Administrator Norman P. Mason was named earlier this year as the first recipient of the newly established *F. Stuart Fitzpatrick Memorial Award* in recognition of his "outstanding individual achievement in the unification of the building industry."

Mr. Mason, 63, received a scroll and commemorative silver medal at the Building Research Institute's Spring Conference in New York City.

Creation of the Award was a spontaneous expression of respect by virtually every segment of the building industry to the memory of Mr. Fitzpatrick, for 25 years the manager of the construction and civic development department of the U.S. Chamber of Commerce. Prior to his death in 1956, Mr. Fitzpatrick had become widely known and respected throughout the building industry for the unifying influence he exerted upon it. Part of this influence led to the founding and growth of the Building Research Institute of the National Academy of Sciences.

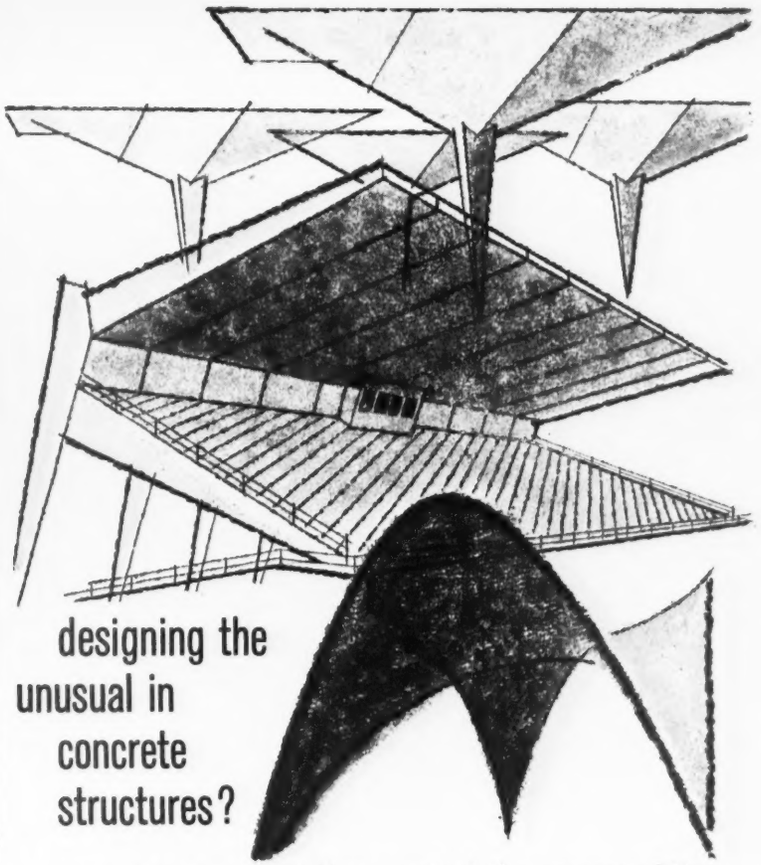
"The F. Stuart Fitzpatrick Memorial Award was created through the donations of more than 100 building industry associations to acknowledge the perpetual debt we owe to his memory and to carry forward his principles of coordination and unification," said Leon Chatelain, Jr., past president of The American Institute of Architects, one of five associations administering the Award.

"We feel that Norman P. Mason is an excellent choice to be the first recipient of the Award. Like that of Mr. Fitzpatrick, Mr. Mason's career has been long, varied, and devoted almost exclusively to the building industry. Again, as was the case with Mr. Fitzpatrick, Mr. Mason is a man of both intellect and leadership ability. And he uses his powers similarly; to bring together in cooperative efforts and harmony the many diverse interests and elements of the nation's single biggest business.

"This performance expresses precisely the spirit of the Award, whose criterion for selection is outstanding individual achievement in the unification of the building industry. The choice of Mr. Mason sets a high standard for future recipients."

Mr. Mason has served the building industry in many roles during his career. A native of New York State, he moved in 1923 to Chelmsford, Mass., where he still maintains a home. There he entered the lumber business and remained a successful manufacturer and dealer until his entrance into national affairs in Washington. During World War II, he was a construction and lumber consultant to the Civilian Production Administration, later taking part in the National Housing Agency's Housing Conference. In 1953, he served as a member of the President's advisory committee on Housing Policies and Programs.

Mr. Mason was appointed Federal Housing Administration Commissioner in 1954 and served in that capacity until his appointment as U.S. Housing Administrator in January, 1959. Additionally, he has served as a director of the U.S. Chamber of Commerce and chairman of its construction and civic development committee; as president of the National Retail Lumber Dealers Assn.; chairman of the board of governors, Building Research Institute; and trustee for the Lumber Dealer's Research Council. He is currently president of the Cooperative Reserve Supply Corp., of Cambridge, Mass., and a member of the board of directors of the Lowell, Mass., Central Savings Bank. Mr. and Mrs. Mason have two children and five grandchildren and live at 3015 Orchard Lane, N.W., Washington, D.C.



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CALENDAR

Oct. 6 ARCHITECTURAL LEAGUE OF NEW YORK: urban renewal show, through November 2, New York City.

15 ARTS OF DENMARK: exhibit of Danish treasures, arts and crafts from prehistoric times to present, through January 8, 1961, Metropolitan Museum of Art, New York City.

17-21 NATIONAL METAL EXPOSITION: Philadelphia, Pa.

17-21 NATIONAL SAFETY CONGRESS: annual meeting, Chicago.

19-23 AMERICAN INSTITUTE OF ARCHITECTS: annual convention of California Council, Yosemite National Park, Calif.

25-27 11TH NATIONAL CONFERENCE ON STANDARDS: Sheraton-Atlantic Hotel, New York City.

26-27 1960 COMPUTER APPLICATIONS SYMPOSIUM: sponsored by Armour Research Foundation of Illinois Institute of Technology, Morrison Hotel, Chicago.

26-29 AMERICAN INSTITUTE OF ARCHITECTS: western mountain region annual conference, El Conquistador Hotel, Tucson, Ariz.

31-2 AMERICAN CONCRETE INSTITUTE: 13th regional meeting, Pioneer Hotel, Tucson, Ariz.

Nov. 2-16 ARCHITECTURAL LEAGUE OF NEW YORK: member exhibit of sculpture and painting, New York City.

14-16 STRUCTURAL CLAY PRODUCTS INSTITUTE: annual convention, Diplomat Hotel, Hollywood, Fla.

15-17 BUILDING RESEARCH INSTITUTE: 1960 fall conferences on preassembled components, Shoreham Hotel, Washington, D. C.

16 ARCHITECTURAL LEAGUE OF NEW YORK: exhibit—new dimensions in architectural photography, through December 14, New York City.

18-22 AIR-CONDITIONING AND REFRIGERATION INSTITUTE: 1960 annual meeting, Hollywood Beach, Fla.

21-22 CONFERENCE ON PRESTRESSED CONCRETE: Sheraton-Palace Hotel, San Francisco.

28-30 AMERICAN SOCIETY OF REFRIGERATING ENGINEERS: semi-annual meeting, Chase-Park Plaza Hotel, St. Louis, Mo.

Dec. 12-15 INDUSTRIAL BUILDING EXPOSITION & CONGRESS: New York Coliseum, New York City.

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